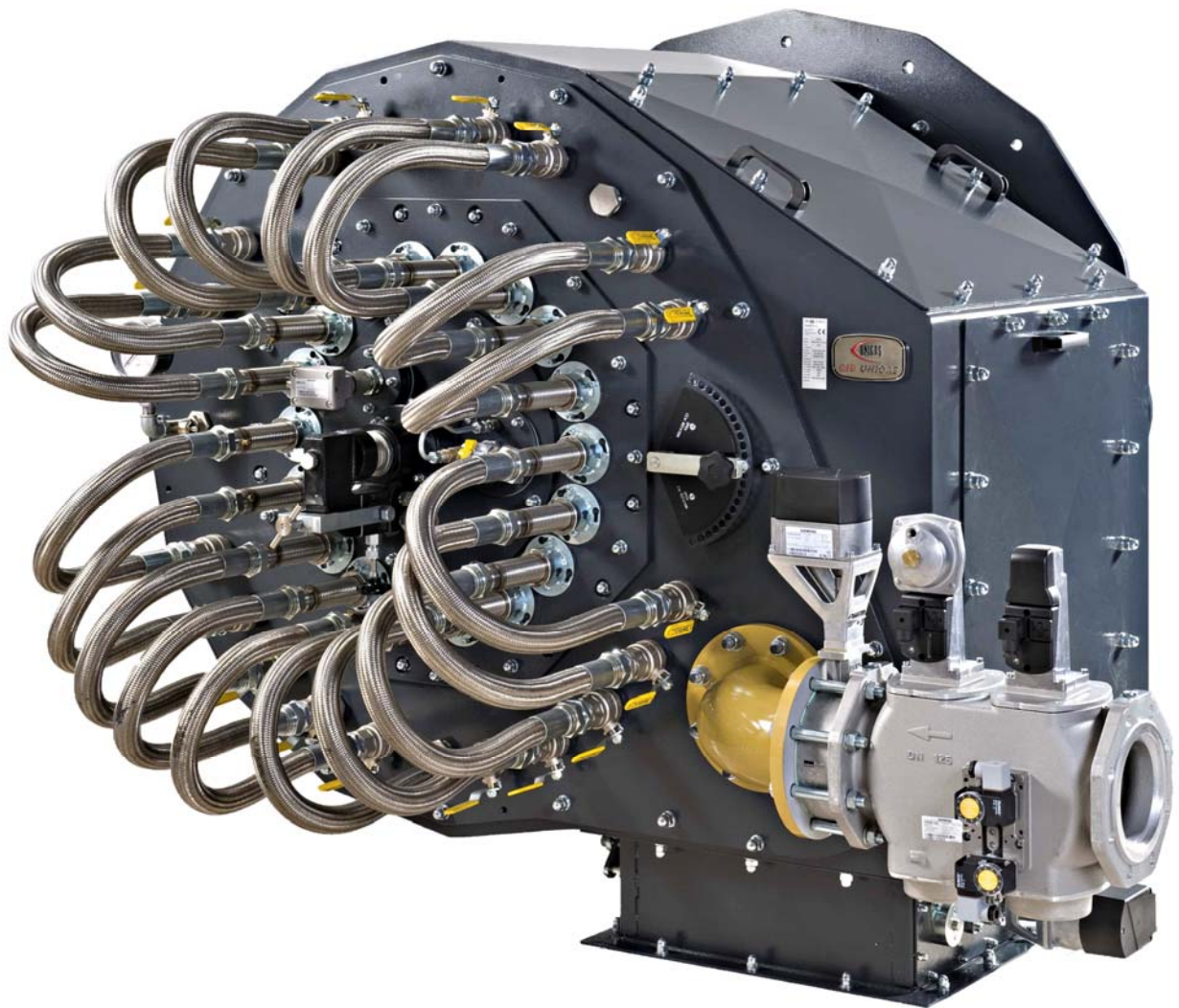


# REGISTER BURNERS

URB SERIES

URB-SH SERIES





# 1 INTRODUCTION

The forced draft burner combines the advantages of the proven register, windbox and fan to supply 100% of air in one complete package.

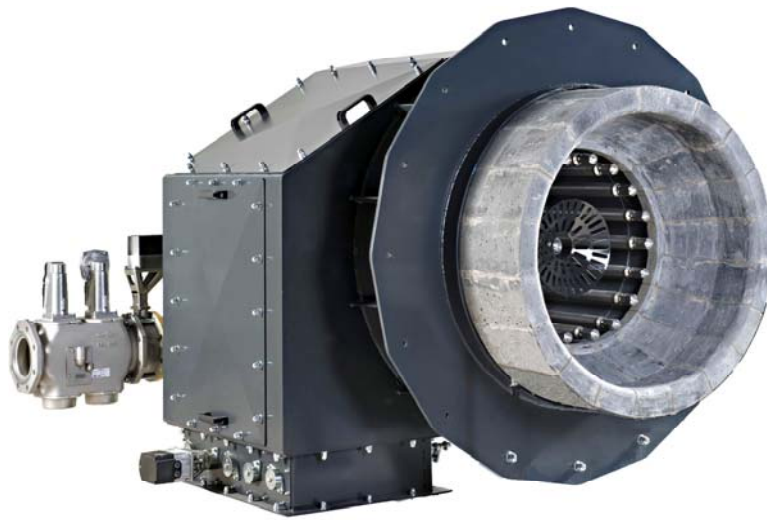
This series of burners has been designed to ensure the maximum flexibility to match the client requests, starting from a base. These are "tailored made" burners who present a compact and economical assembly. Combustion controls, safety controls, pre-piped and wired fuel trains are an integral part of the burner package.

Burner mounting and installation time is minimised.

Package systems are available for heat requirements that range from 5 MW to 83 MW.

Components operation is checked and tested at the factory prior to shipment.

The URB register burner series with the refractory blast tube is recommended to be matched on hot water pipe boiler, with squared combustion chamber section



Picture 1 – URB burner series

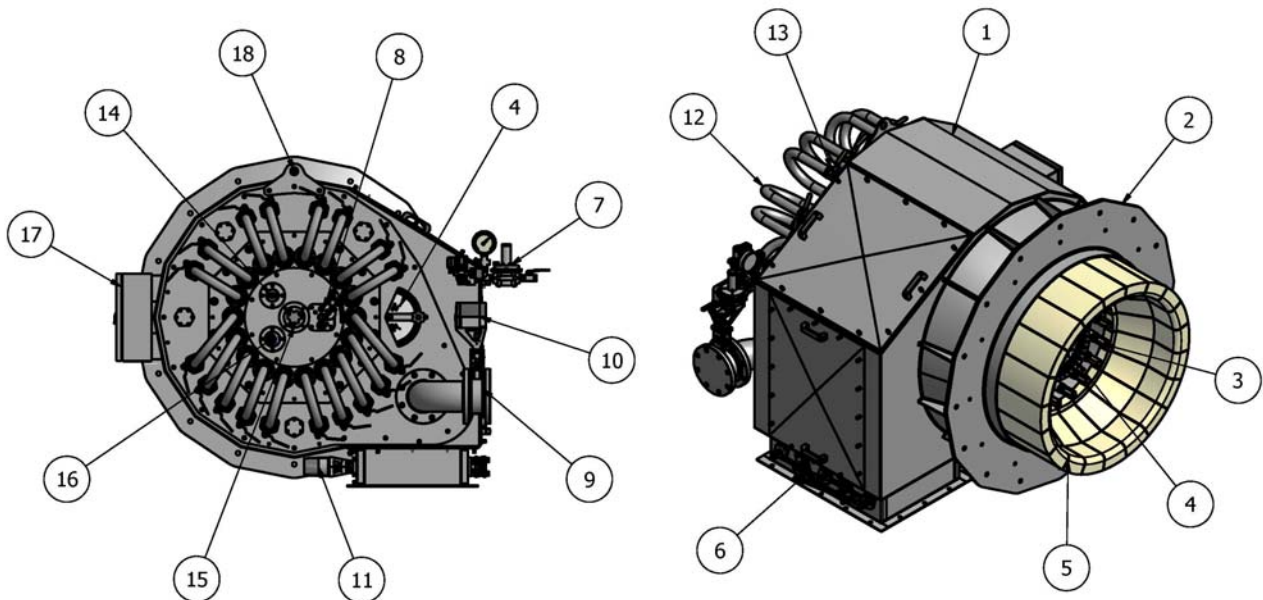
The register burner with steel blast tube are called URB-SH. This burner family is recommended to be matched on boiler with cylindrical section of high output



Picture 2 – URB-SH burner series

## 1.1 Main features:

- Single or mixed fuel (HFO, LDO, NG, LPG, Waste gas, Crude oil,...),
- High turndown ratio;
- Micro processor controlled burners
- Less plant cycling
- Extended boiler life
- Adjustable gas lances and nozzles
- Adjustable register
- Pneumatic oil atomization (standard is steam atomization)
- Easy access for maintenance
- Optional units to complete the burner supply
- Easy mounting on boiler thanks to the preassembled parts supply and thanks to the fuel trains with associated hardware mounted on self-supporting frames.



### Keys:

- |   |                       |
|---|-----------------------|
| 1. Wind box                               | 10. Gas actuator      |
| 2. Burner flange                          | 11. Air actuator      |
| 3. Gas lances and nozzles                 | 12. Flexible hoses    |
| 4. Diffuser                               | 13. Manual valves     |
| 5. Blast tube (refractory tiles or steel) | 14. Flame detector    |
| 6. Air damper                             | 15. Oil gun           |
| 7. Pilot gas train                        | 16. Inspection window |
| 8. Pilot burner                           | 17. Junction box      |
| 9. Butterfly valve                        | 18. Eye bolts         |

## 1.2 Windbox and Register Assembly

The burner windbox is assembled of heavy gauge welded steel.

Insulated windboxes for use with pre-heated combustion air are available.

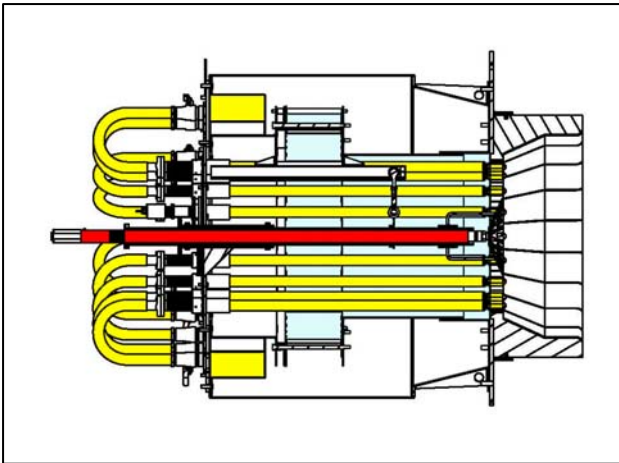
The offered machines are forced natural gas burners, designed with a single or a double air registers in reference to the output that the machine must develop.

Two inspection doors are provided. They are not only useful for the maintenance, but they also offer the possibility to switch the position of the air damper on one of them, if the lay-out of the plant requires any adjustments on the site, or to add a second damper in case a second combustion air stage or a flue gas recirculation is required.

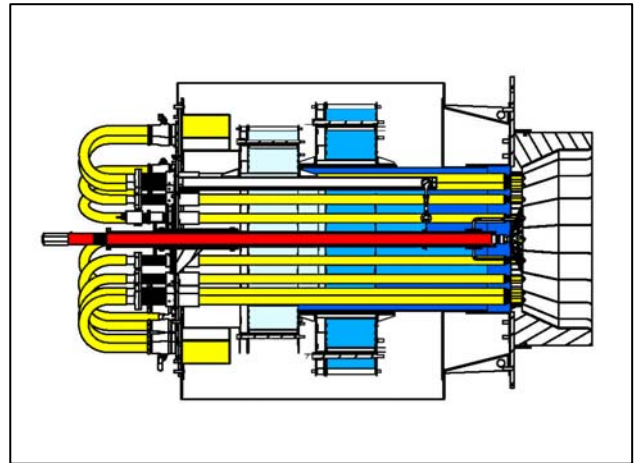
Burner registers are designed and mounted in the windbox to permit an easy access for maintenance and to ensure a balanced air distribution in the windbox.

Each register is complete with a manual control handle and a mechanical indicator. The air registers will be adjusted in the proper position at the start-up, to ensure a proper flame distribution in the combustion chamber and an optimum mixing of fuel with turbulent air, to reach an high efficiency in terms of heat exchange and emission values.

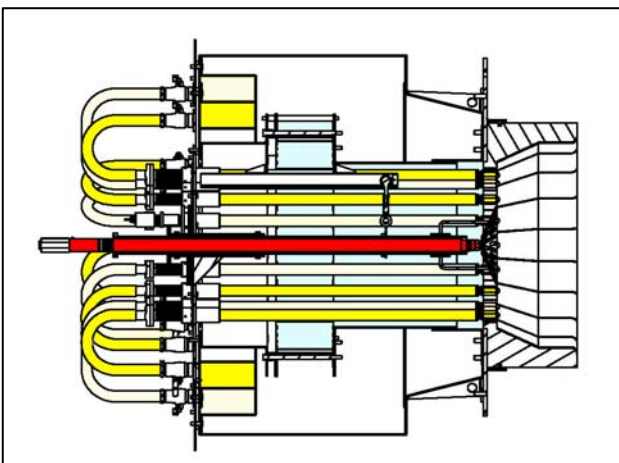
The URB burners series, can be supplied in several configuration, in reference to the target they have to achieve (below some schematic example).



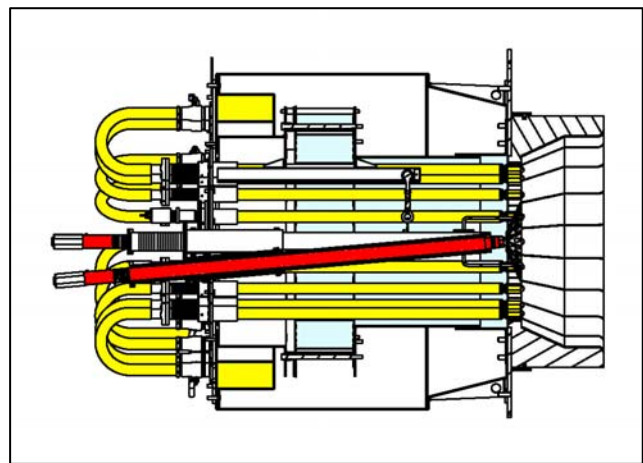
Picture 3 - Single register configuration



Picture 4 – Double register configuration



Picture 5 - 3 Fuel (2 gases + 1 Oil) configuration



Picture 6 - 3 Fuel (1 Gas + 2 Oils) configuration

### 1.3 Blast tube

URB burner series is supplied with a refractory blast tube made by a set of preformed and precooked refractory bricks including from average 59%  $Al_2O_3$ .

The tubes must be mounted at site on the boiler front wall by professional and qualified personnel, according to CIB UNIGAS lay-out drawings and recommendations.

### 1.4 Gas lances and nozzles

The natural gas flow, regulated by a motorised butterfly valve, reaches a gas ring and, passing through flexible hoses and manual valves, it enters into several lances to be guided up to the gas nozzles.

The stainless steel nozzle series is distributed all around the refractory blast tube, in order to optimize the gas distribution into the combustion chamber, for an high combustion efficiency and to limit the production of thermal oxides of nitrogen (NOx) and carbon monoxide (CO).

Each lance, so each nozzle, can be adjusted and removed during the operation in the plant (start-up and maintenance).

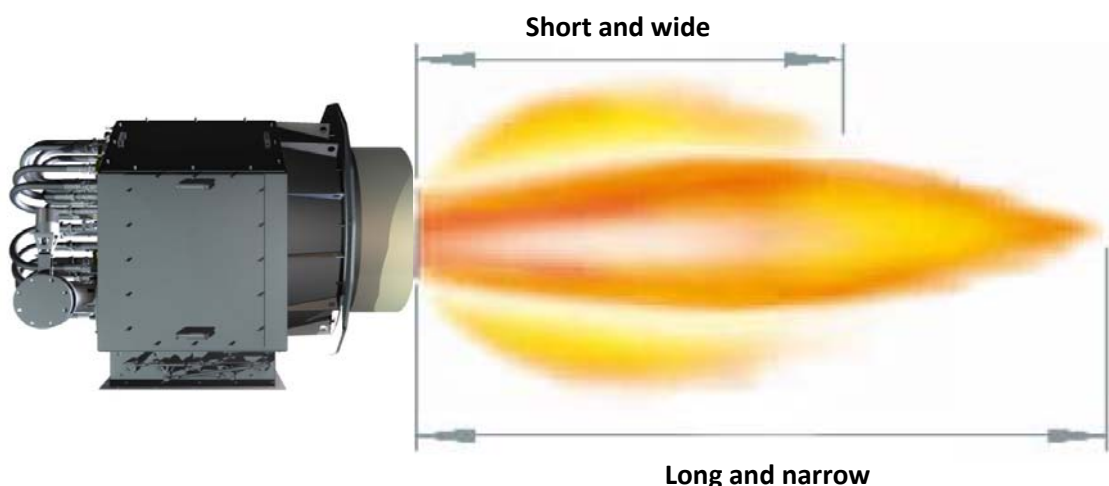
### 1.5 Oil atomisation

Oil is atomised inside the combustion chamber by means a stainless steel nozzle.

The nozzle is mounted on a lance with the possibility of automatic and manual cleaning by means steam or compressed air.

## 2 THE ADVANTAGE OF THE ADJUSTABLE REGISTER AND THE ADJUSTABLE GAS LANCES

- Optimized fuel-combustion air mixture
- High combustion efficiency
- High turndown ratio
- Improvement in the emission values
- No vibration
- Increased flexibility in the flame shape adjustment.
- Easy access for maintenance on the gas nozzles while the burner is running



The flame shape can be regulated at the first start-up, in accordance with the environment where it develops itself. The combustion chamber dimensions affect the flame shape too.

All these advantages can:

- extend the boiler life
- reduced maintenance and operations time
- fuel saving and so costs of the plant.

### 3 DIRECTIVES AND STANDARDS

URB and URB-SH series are certified CSEI for the Chinese market.

CIB UNIGAS provides a declaration of conformity that all its burned satisfy the basic requirements of the following European Directives and Standards, that the parts (or clauses thereof) of following harmonized Standards have been applied.

#### **Directives common to all the register burners series:**

##### *European Directives:*

**2006/95/CEE** Low voltage Directive  
**2004/108/CEE** Electromagnetic compatibility Directive

##### *Harmonized Directive*

**EN 55014-1** Electromagnetic compatibility. Immunity requirements for household appliances, tools and similar apparatus. Product family standard  
**UNI EN 746-2** Industrial thermo-processing equipment - Part 2: Safety requirements for combustion and fuel handling systems  
**CEI EN 60335-1** Household and similar electrical appliances - Safety - Part 1: General requirements  
**EN 60335-2-102** Household and similar electrical appliances - Safety - Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections

#### **Gas burners**

##### *European Directive*

**2009/142/CE** Gaseous fuels Directive

##### *Harmonized Standard*

**UNI EN 676** Automatic forced draught burners for gaseous fuels

#### **Diesel oil burners**

##### *Harmonized Standard*

**UNI EN 267** Automatic forced draught burners for liquid fuels  
**EN 50165** Electrical equipment of non-electric appliances for household and similar purposes. Safety requirements

##### *National Standard*

**UNI 7824** Monoblock nebulizer burners for liquid fuels. Characteristics and test methods

#### **Heavy oil burners**

##### *Harmonized Standard*

**EN 50165** Electrical equipment of non-electric appliances for household and similar purposes. Safety

##### *National Standard*

**UNI 7824** Monoblock nebulizer burners for liquid fuels. Characteristics and test methods

#### **Dual fuel burners**

The above references can be taken for both the fuels.



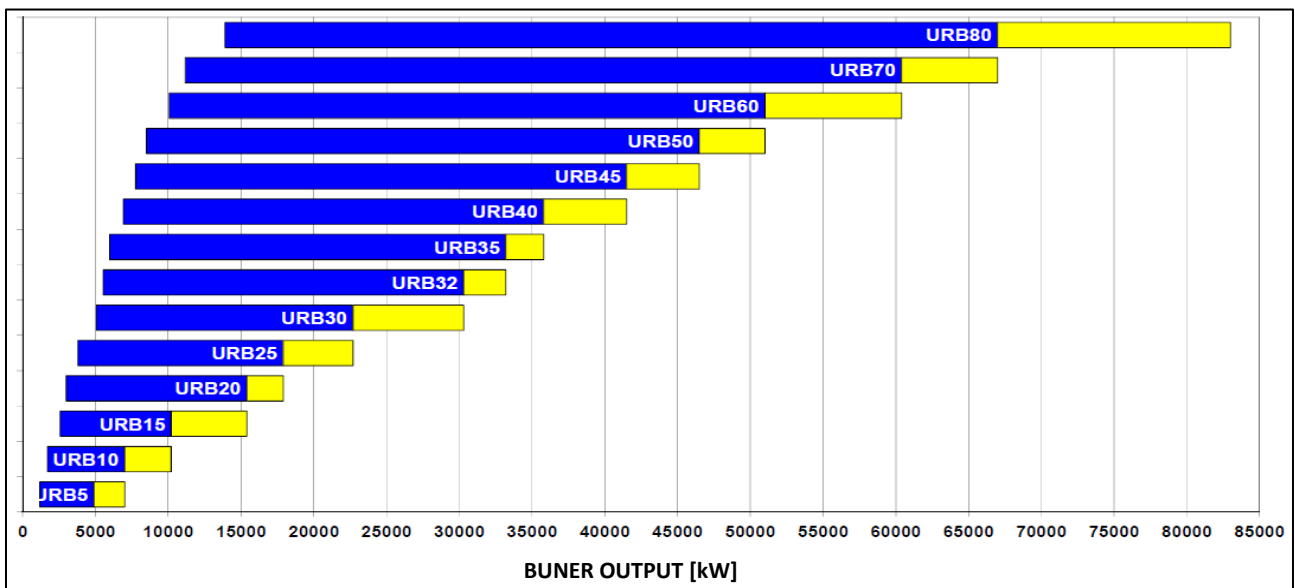


## 4 TECHNICAL SPECIFICATIONS AND PERFORMANCE CURVES

### 4.1 URB series

BURNER TYPE		URB5	URB10	URB15	URB20	URB25	URB30	URB32	URB35	URB40	URB45	URB50	URB60	URB70	URB80
Maximum burner output	kW	7000	10200	15400	17900	22700	30300	33200	35800	41500	46500	51000	60400	67000	83000
Minimum burner output with turn down rate 1/6	kW	1167	1700	2567	2983	3783	5050	5533	5967	6917	7750	8500	10067	11167	13833
Setam boiler production	TPH	9,3	13,5	20,4	23,7	30,0	40,1	43,9	47,4	54,9	61,5	67,5	79,9	88,6	109,8
Combustion air flow	Nm <sup>3</sup> /h	8420	12269	18523	21530	27303	36445	39933	43060	49916	55930	61343	72649	80587	99832
Combustion air pressure at the burner inlet if backpressure is null	mbar	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Max nat gas inlet pressure	bar	0,7	0,7	0,7	0,7	0,7	0,7	0,7	1	1	1	1	1	1	1
Natural gas flow	Stm <sup>3</sup> /h	741	1080	1630	1895	2403	3207	3514	3789	4393	4922	5398	6393	7092	8785
Fuel oil flow	kg/h	610	889	1343	1561	1979	2642	2895	3121	3618	4054	4446	5266	5841	7236
Fuel oil viscosity		4000 cSt @ 50 °C													
Athomisation steam flow	kg/h	92	133	201	234	297	396	434	468	543	608	667	790	876	1085
Athomisation compressed air flow	kg/h	153	222	336	390	495	660	724	780	905	1014	1112	1317	1460	1809
Power supply		400 V 3 N.A.C. 50 Hz													
Total power supply consumption	kW	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Protection degree		IP54													
Steam componets		PN16													
Operating temperature	°C	-10 ÷ +50													
Storage Temperature	°C	-20 ÷ +60													

Table 1 – URB burner series technical data



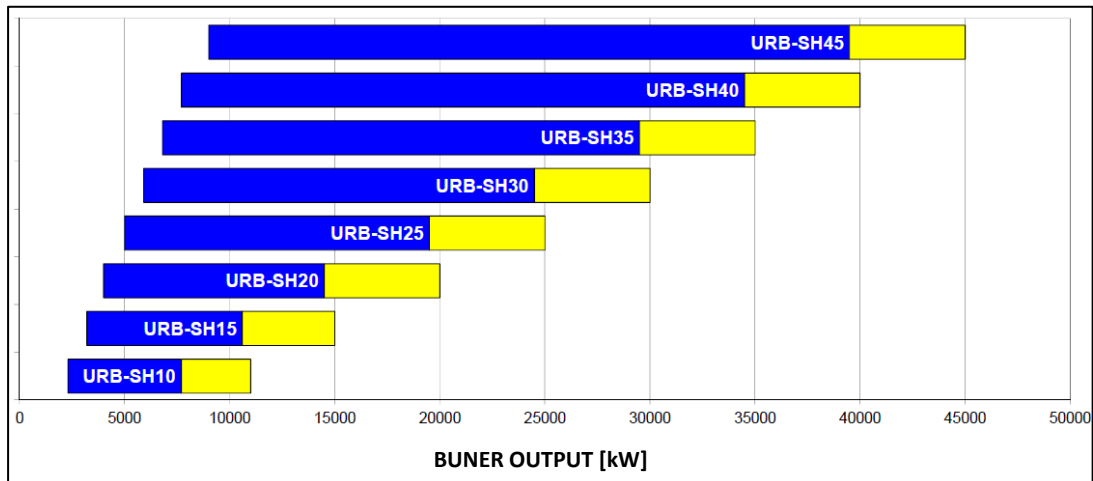
Picture 8 – URB series performance curves

See the note at the end of the chapter

## 4.2 URB-SH series

BURNER TYPE		URB-SH15	URB-SH20	URB-SH25	URB-SH30	URB-SH35	URB-SH40	URB-SH45
Maximum burner output	kW	15000	20000	25000	30000	35000	40000	45000
Minimum burner output with turn down rate 1/6	kW	2500	3333	4167	5000	5833	6667	7500
Setam boiler production	TPH	19,8	26,5	33,1	39,7	46,3	52,9	59,5
Combustion air flow	Nm <sup>3</sup> /h	18042	24056	30070	36084	42098	48112	54126
Combustion air pressure at the burner inlet id backpressure is nill	mbar	60	60	60	60	60	60	60
Max nat gas inlet pressure	bar	0,7	0,7	0,7	0,7	0,7	0,7	0,7
Natural gas flow	Stm <sup>3</sup> /h	1588	2117	2646	3175	3705	4234	4763
Fuel oil flow	kg/h	1308	1744	2180	2616	3052	3487	3923
Fuel oil viscosity		4000 cSt @ 50 °C						
Athomisation steam flow	kg/h	196	262	327	392	458	523	589
Athomisation compressed air flow	kg/h	327	436	545	654	763	872	981
Power supply		400 V 3 N A.C. 50 Hz						
Total power supply consumption	kW	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Protection degree		IP54						
Steam componets		PN16						
Operating temperature	°C	-10 ÷ +50						
Storage Temperature	°C	-20 ÷ +60						

Table 2 – UR-SH burner series technical data



Picture 9 – URB series performance curves

## 4.3 NOTE: URB & URB-“Technical data” and “Performance curves”:

- Burner output is at Standard environment conditions (t = 15 °C and p = 1013 mbar).
- Natural gas LHV = 9,45 kWh/ Stm<sup>3</sup> (8125 kcal/Stm<sup>3</sup>).
- Fuel oil LHV = 11,47 kWh/kg (9864 kcal/kg).
- Boiler steam output refers to steam enthalpy of 650 kcal/kg (including boiler efficiency).
- Inlet gas train pressure and butterfly valve pressure must be constant and stabilized.
- Total power supply doesn't include draught fan power.
- All mediums flow and combustion air pressure are referred to the max burner output.

## 5 DRAUGHT FAN

Draught fan can be supplied by CIB UNIGAS on request.

Its fan choice must be made in reference to the technical data table and in reference to other many factors, as the backpressure, the burner output, the ambient conditions and the combustion air temperature.

All the URB burners are tailored made, so designed time by time, in reference to the plant needs. The pressure values for the fan choice should be confirmed in order to size the right performance of the machine and to save energy, so costs, for the plant.



Picture 10 – Draught fan with indirect motor coupling

The following table gives an idea of the draught fan electrical motor size could be matched to URB series, but it isn't binding.

It considers the following input data.

- Maximum burner output
- Backpressure  $\leq 10$  mbar
- Air duct pressure loss = 3 mbar
- Standard ambient condition (1013 mbar and 15 °C)

BURNER TYPE		URB5	URB10	URB15	URB20	URB25	URB30	URB32	URB35	URB40	from URB45 to URB80
Draught fan electrical motor	kW	18,5	22	37	45	55	90	110	110	132	on request

Table 3 – URB series draught fan motor output

High hydraulic head fan are matched to the URB-SH series. Their electrical motor is usually indirectly coupled to the wheel, so it becomes difficult to give here reference of the motor output, because of the several variables that exists in these kinds of applications.

## 6 CONTROL PANEL

URB and URB-SH burner series supply is completed with an electrical control panel including the burner logic (standard supply) and the draught fan output (optional supply).

The logic control all the burner operation phases:

- Stand-by (the photocell must not see any flame inside the combustion chamber in this phase)
- Prepurge
- Pilot ignition
- Main flame ignition
- Modulation
- Shutting down
- Postpurge
- Gas valve proving system
- Pressure or temperature of the fuel, in reference of the type it is burned

The motor output control panel includes all the safeties for the fan motors: delta star connection or soft starter, contactors, thermal or magneto-thermal protections, fuses...

Inverter (VSD) should be used for big size electrical motors and it should be matched with breaking resistors and filters at the inlet, to cut EMC noises.

The inverter is under the control of the burner logic that receives a feed back signal from the speed sensor applied on the motor shaft. In all the moments, the burner control device checks the VSD output status and its correspondence with the real value at the fan motor. Safety and accuracy are ensured.

For more details about the burner logic, please check the “BURNER MANAGEMENT SYSTEM” chapter

Logic control panel is standard supplied with the burner.

All the items (valves, controls, ignition transformer...) are wired on a junction box burner on board.

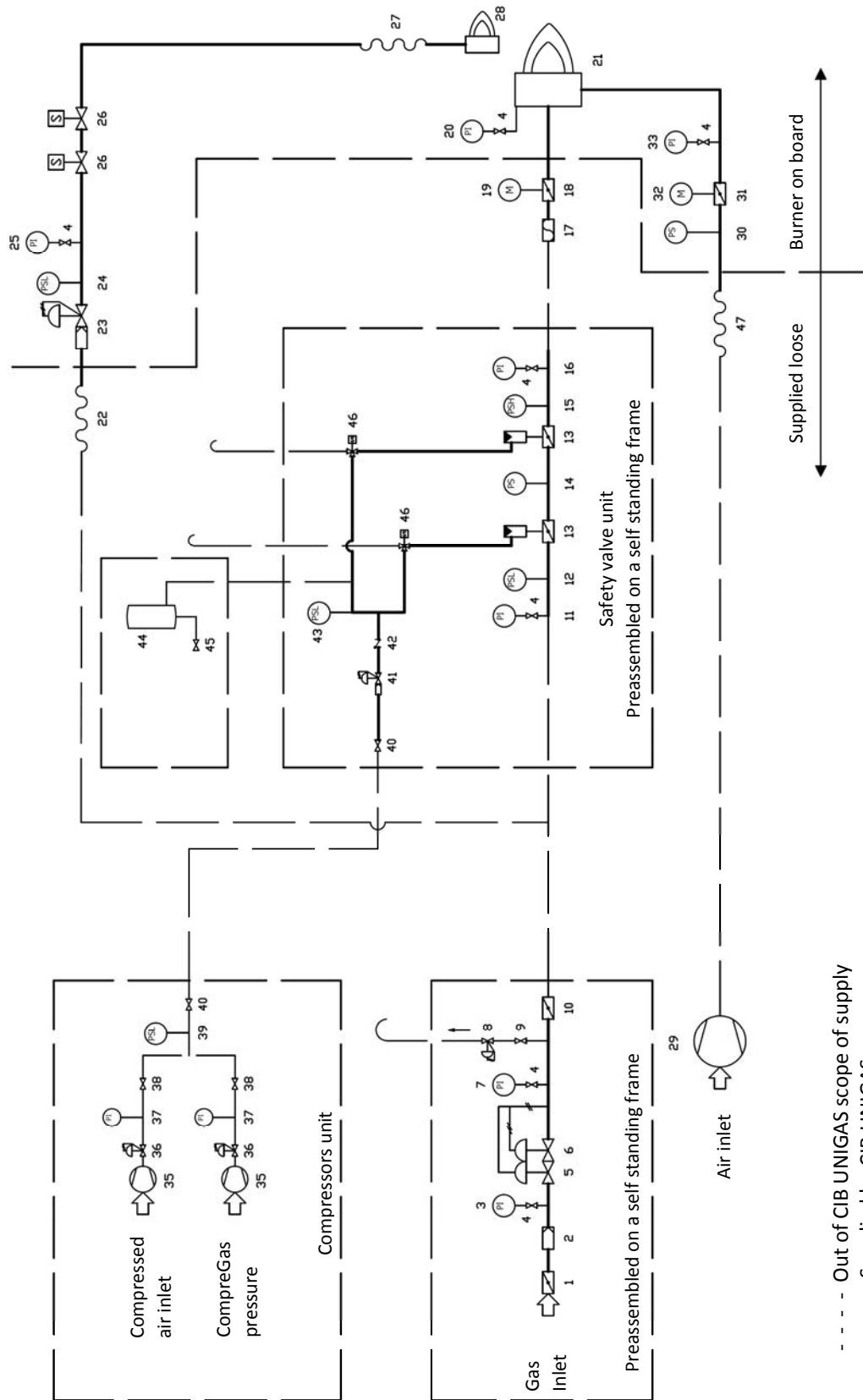
All the system is factory tested before the shipment.



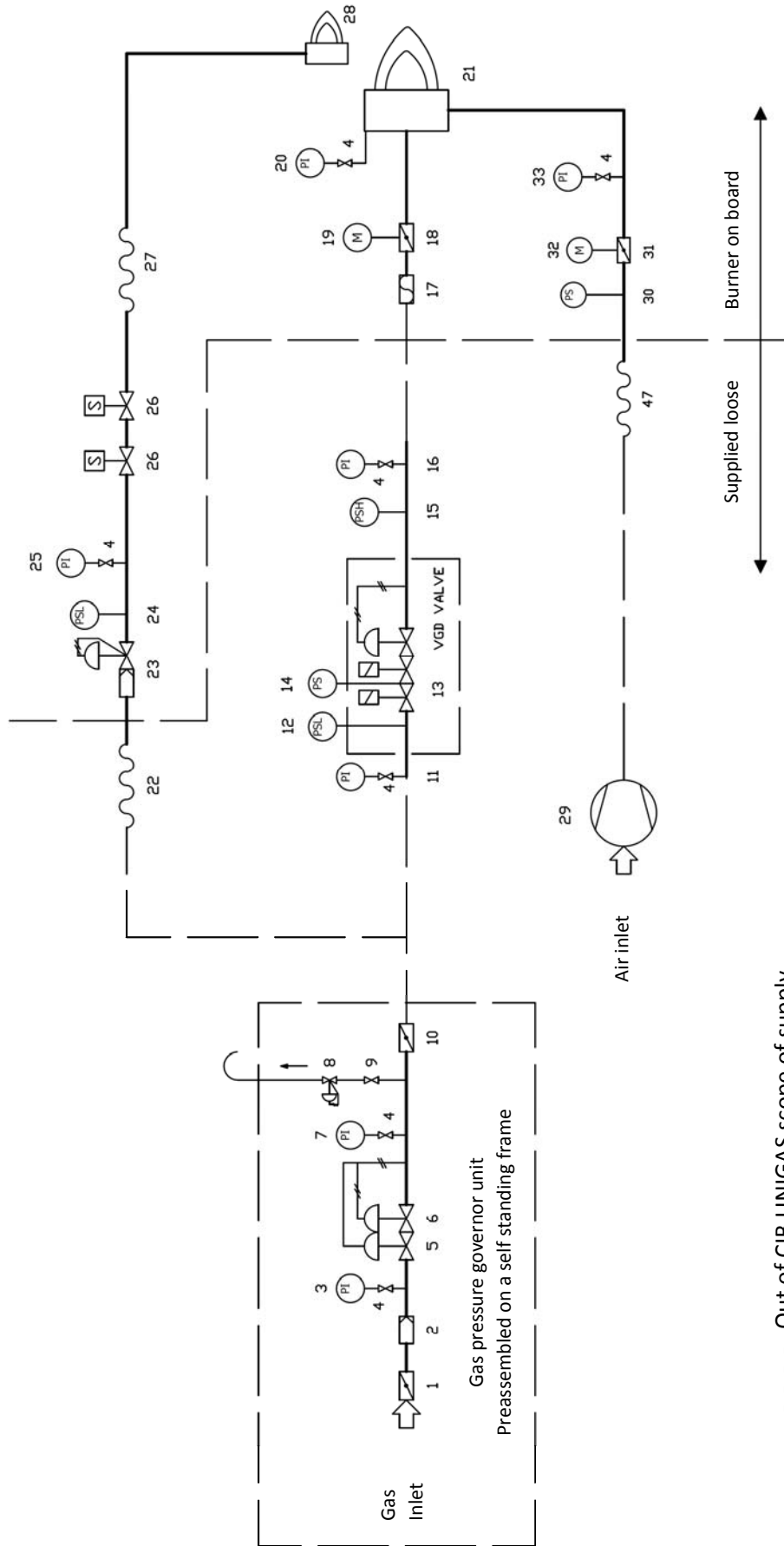
Picture 11 – Control panel: desk type and cabinet type with inverter

# 7 PREASSEMBLED UNITS

## 7.1 GAS TRAIN (standard supply)



Picture 12 - P&ID: gas train with pneumatic safety valves



- - - - Out of CIB UNIGAS scope of supply  
 ——— Supplied by CIB UNIGAS

Picture 13 – P&ID: gas train with VGD valve (2 safety valves with built in pressure governor)

POS	Description
<b>Gas pressure governor unit</b>	
1	Manual valve
2	Filter
3	Pressure gauge
4	Manual valve
5	Shut off valve
6	Governor
7	Pressure gauge
8	Relief valve
9	Manual valve
10	Manual valve
<b>Main gas train</b>	
11	Pressure gauge
12	Minimum pressure switch
13	Safety valve
14	Proving system pressure switch
15	Maximum pressure switch
16	Pressure gauge
17	Bellows unit
18	Butterfly valve
19	Actuator
20	Pressure gauge
21	Burner
<b>Pilot gas train</b>	
22	Flexible hose
23	Pressure governor with filter
24	Pressure switch
25	Pressure gauge
26	Safety valve
27	Flexible hose
28	Pilot burner

POS	Description
<b>Air train</b>	
29	Draught fan
30	Air damper
31	Actuator
32	Pressure switch
33	Pressure gauge
47	Air duct bellows unit
<b>Compressed air train</b>	
35	Compressor
36	Pressure governor
37	Pressure gauge
38	Manual valve
39	Pressure switch
40	Manual valve
41	Pressure governor with filter
42	One way valve
43	Pressure switch
44	Tank
45	Manual valve
46	3-way electrovalve
47	Bellows unit

Table 4 – PD& legend: gas train

**NOTE:**

Gas pressure must be steady at gas train inlet.

7.1.1 Example of gas train assembly



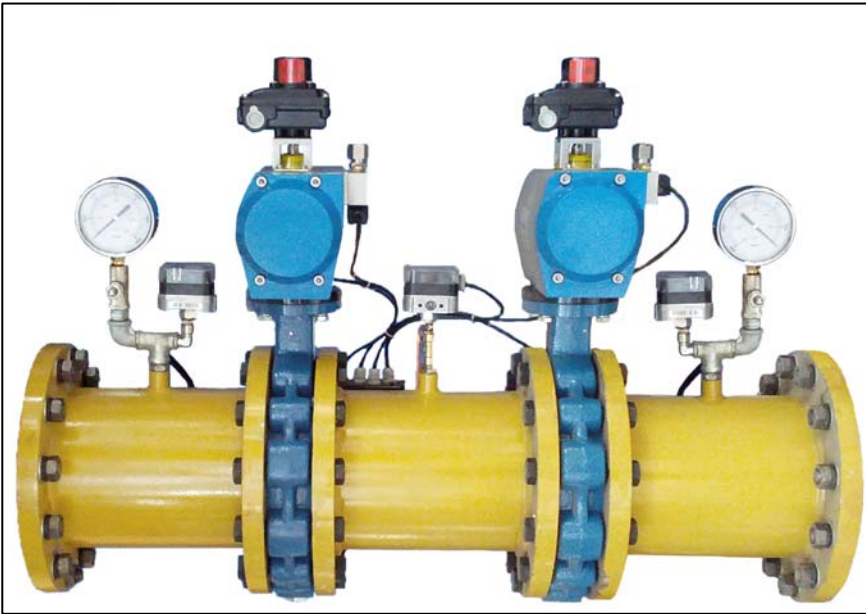
Picture 14 – Pressure governor unit, preassembled on a frame



Picture 15 – Siemens VGD safety valves, preassembled train



Picture 16 – Krom Schroeder safety valves, preassembled train



Picture 17 – Pneumatic safety valve unit with position switches, pressure switches and gauges



## 7.2 THE OIL TRAIN

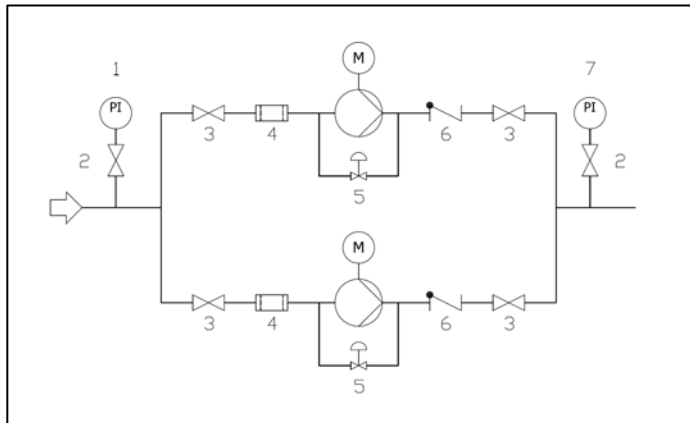
### 7.2.1 Oil Pumping Unit (optional supply)

CIB UNIGAS standard scope of supply consists of two pump lines: one working and one in stand-by. In this way it is possible to maintain the pump or the filter, without to turn off the burner.

In particular cases, it is possible to combine the oil pump unit together with the oil heating unit or with an electrical heater at the inlet of the pumps if the viscosity is too high.

Pumps are sized to assure a pressure of about 10 bar at the oil nozzle (so it is important where the pump unit is installed in reference to the burner).

In case of heavy oil, filter can be equipped with an electric resistance and thermostat



POS	Description
1	Vacuum / Pressure gauge
2	Manual valve
3	Manual valve
4	Filter
5	Pump with electrical motor
5	One way valve
7	Pressure gauge

Picture 18 – P&ID: Oil Pumping Unit

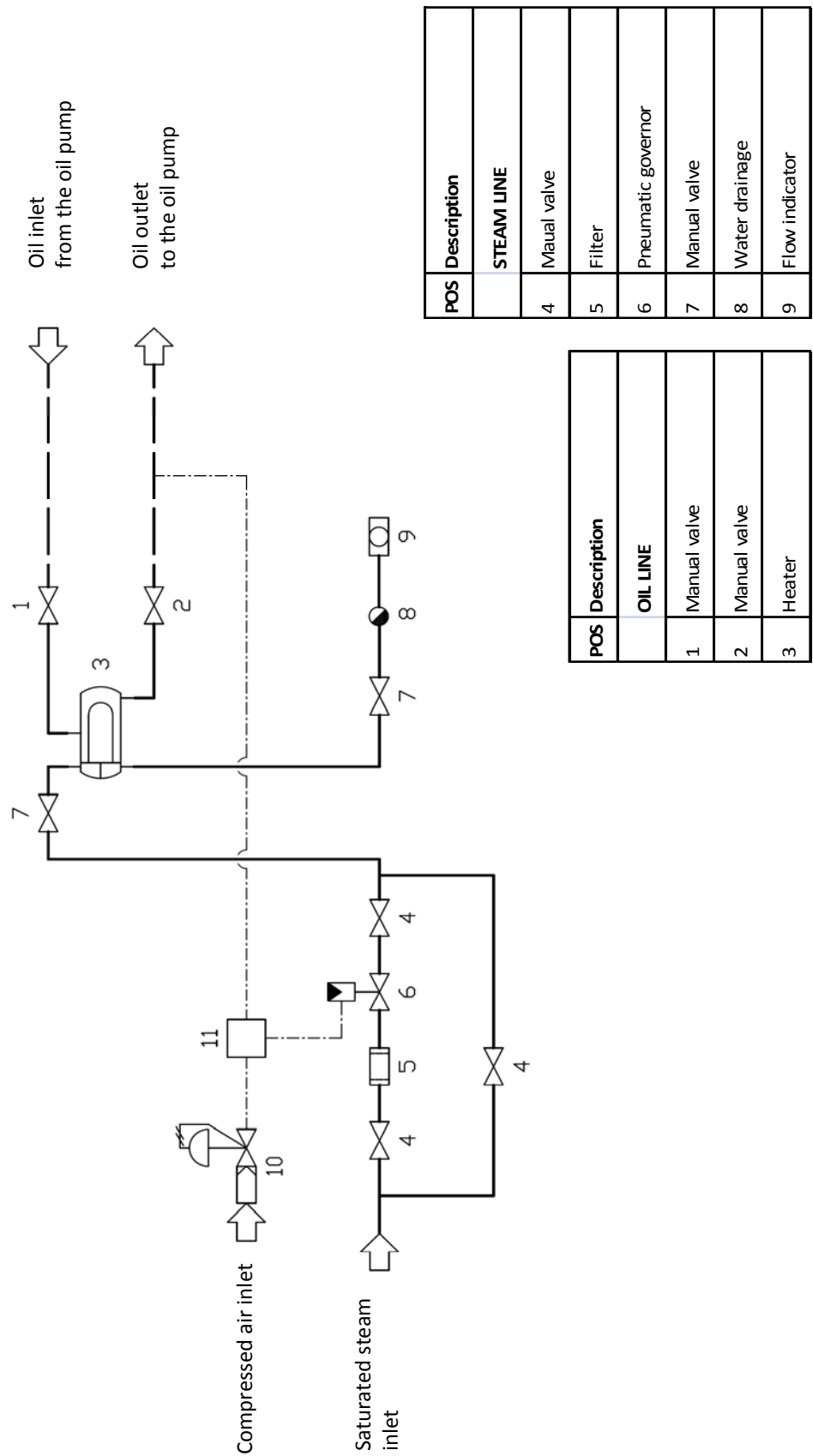


Picture 19 – Oil pump units - with self cleaning filter (junction box or control panel)



Picture 20 – Oil pump units: with self cleaning filter and oil heaters (electrical and/or steam)

7.2.2 Oil Heating Unit (optional supply)



Picture 21 – P&ID: standard Oil Heating Unit (OHEU)

In case of heavy oil, or fuels with an high viscosity, CIB UNIGAS is able to supply preassembled unit to pre-heat the fuel oil before it enters into the oil handling unit and the burner.

The widely used oil heating medium is the saturated steam, but depending on the application, the burner can be equipped also with electrical heaters (low burner outputs, hot water boilers), or hot oil heaters.

Standard supply is with one heater, but in reference of the needs and the client requests, solutions with a double heater can be provided, in order to assure the continuous burner working during the unit maintenance.

The oil heating unit is supplied with a thermo-regulator that modulates the positioning of a pneumatic valve, in order to keep the outlet oil temperature at the set-point value.

For a good atomisation, the oil viscosity should be about 3 °E at the nozzle.



Picture 22 – OHEU: standard configuration with one heater

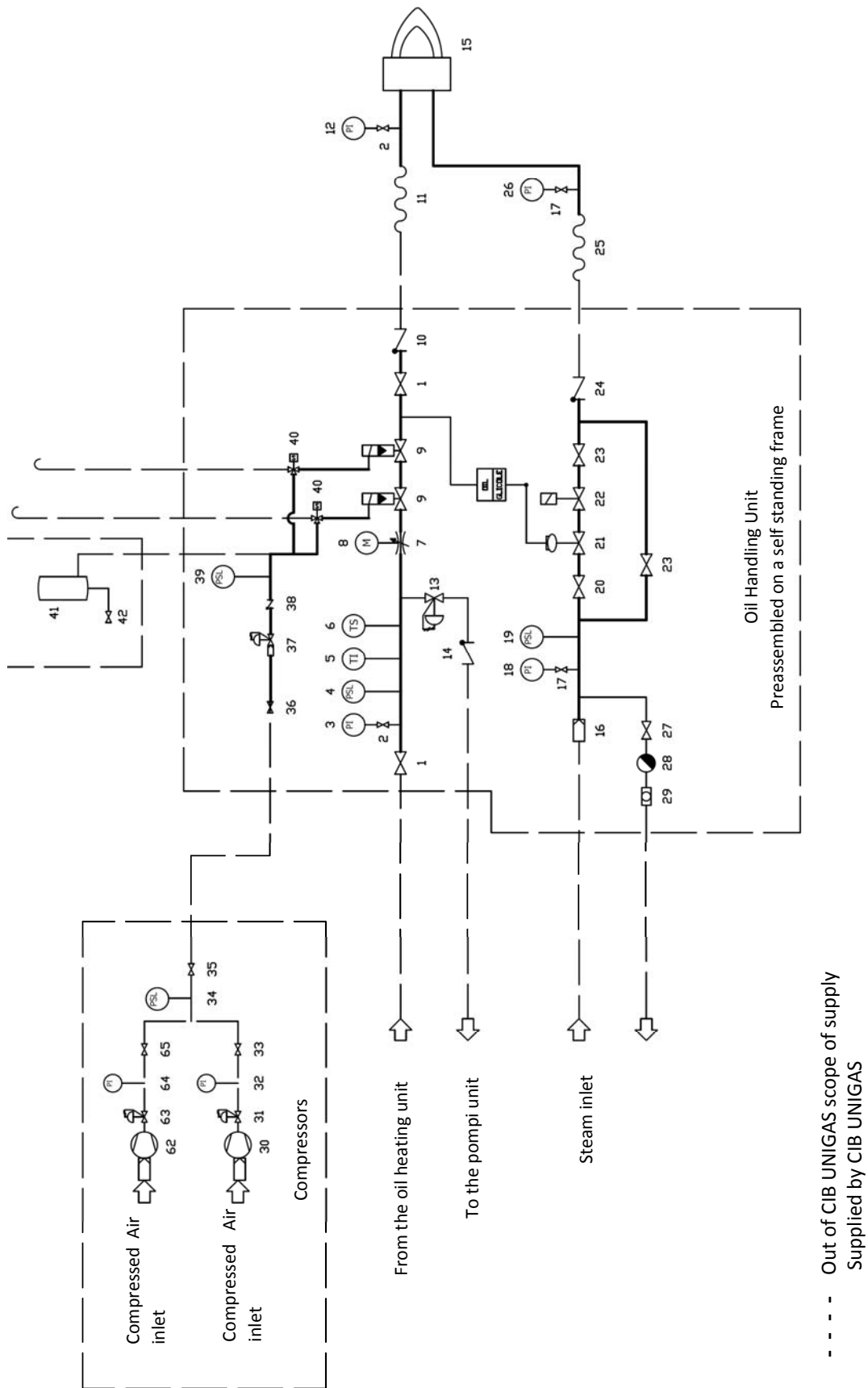


Picture 23 – one steam and one electrical heater



Picture 24 – OHEU – 2 oil/steam heaters

7.2.3 Oil Handling Unit (standard supply)



Picture 25 – P&ID: URB Oil Handling Unit, preassembled on a self standing frame

POS	Description
<b>Oil line</b>	
1	Manual valve
2	Manual valve
3	Pressure gauge
4	Pressure switch
5	Temperature gauge
6	Temperature switch
7	Metering valve
8	Actuator
9	Safety valve
10	One way valve
11	Flexible hose
12	Pressure gauge
13	Pressure governor
14	One way valve
15	Burner
<b>Steam line</b>	
16	Filter
17	Manual valve
18	Pressure gauge
19	Pressure switch
20	Manual valve
21	Differential pressure governor

POS	Description
<b>Steam line</b>	
22	Safety valve
23	Manual valve
24	One way valve
25	Flexible hose
26	Pressure gauge
27	Manual valve
28	Water discharger
29	Water drainage
<b>Compressed air line</b>	
30	Compressor with filter
31	Pressure governor
32	Pressure gauge
33	Manual valve
34	Pressure switch
35	Manual valve
36	Manual valve
37	Pressure governor
38	One way valve
39	Pressure switch
40	3-way valve
40	Manual valve
41	Storage tank
42	Manual valve

Table 5 – P&ID legend : Oil Handling Unit



Picture 26 – Oil Handling Unit preassembled on a self standing frame

## 8 EMISSIONS

The emission values are the result of the matching among the burner, the boiler and the plant. So, the NO<sub>x</sub>, CO or other elements, as sulphur or vanadium compound, values depends on the:

- fuel composition (N content in the fuel can affect NO<sub>x</sub> values on the smokes)
- boiler type and combustion chamber dimensions
- boiler medium type (steam or hot water, hot oil, melt salts, hot air...)
- boiler medium pressure and temperature
- burner configuration and regulation
- combustion air temperature
- ambient conditions
- .....

According to the European Standards, the URB series can assure the following values:

Fuel	Natural gas	Light oil	Heavy oil
Burner output	100%	100%	100%
O <sub>2</sub>	3%	3%	3%
Air excess	1,14	1,14	1,14
CO <sub>2</sub>	10,0%	13,2%	13,2%
CO max	≤ 100 mg/kWh	≤ 110 mg/kWh	≤ 110 mg/kWh
CO usually regulated in the plant	0 ppm	0 ppm	0 ppm
NO <sub>x</sub> according to class 1	≤ 170 mg/kWh	≤ 250 mg/kWh	500÷600 mg/kWh
NO <sub>x</sub> according to class 2	≤ 120 mg/kWh	≤ 185 mg/kWh	-
NO <sub>x</sub> according to class 3	≤ 80 mg/kWh	≤ 120 mg/kWh	-
Standard of reference	UNI EN 676	UNI EN 267	-

**Table 6 – Emission values in reference to the fuel type**

The above values are referred to the following conditions:

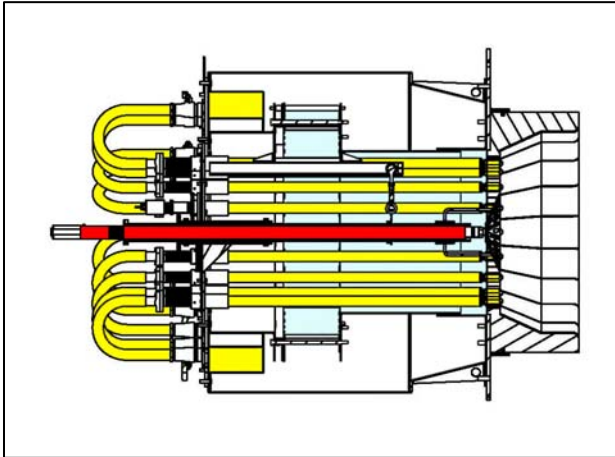
- Combustion air temperature = 20 °C
- Combustion air humidity = 10 g/kg
- Fuel reference see the below table

Natural gas	Low calorific value	8125 kcal/Stm <sup>3</sup>
Diesel	Viscosity	1,6 - 6 cSt @ 20 °C
	Low calorific value	10250 kcal/kg
	Density	880 kg/m <sup>3</sup>
Heavy oil	Viscosity	50 ° E @ 50 °C
	Low calorific value	9950 kcal/kg
	Density	990 kg/m <sup>3</sup>
	N	max 0,3 %

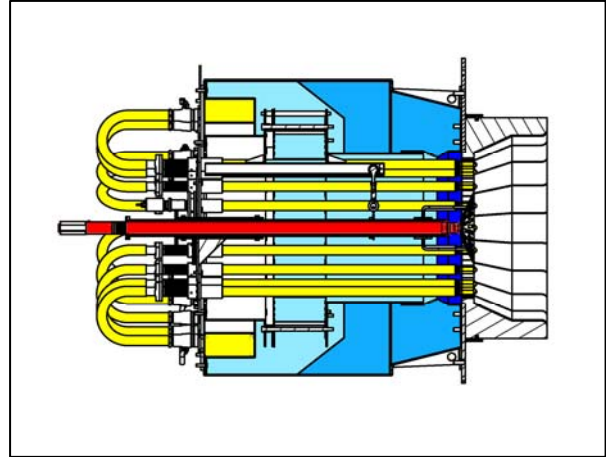
**Table 7 – Fuel reference characteristics for Table 6 – Emission values in reference to the fuel type**

As for reference, we can ensure the following data: URB in standard configuration, matched to a hot water boiler ( $t_{H_2O} = \max 130 \text{ }^\circ\text{C}$ ), can match the NOx class 2 ( $\leq 120 \text{ mg/kWh}$ ) if the combustion air is  $15 \text{ }^\circ\text{C}$  and the thermal load of the combustion chamber is about  $0,4 \text{ MW/m}^3$ .

By means of other technologies, as FGR (Flue Gas Recirculation), "Venturi" or both combined, it is possible to achieve values under the  $80 \text{ mg/kWh}$ . In some cases it is possible to reach the target of  $40 \text{ mg/kWh}$  ( $20 \text{ ppm}$ ).



Picture 27 – Standard configuration



Picture 28 – Stage combustion configuration (two air dampers)

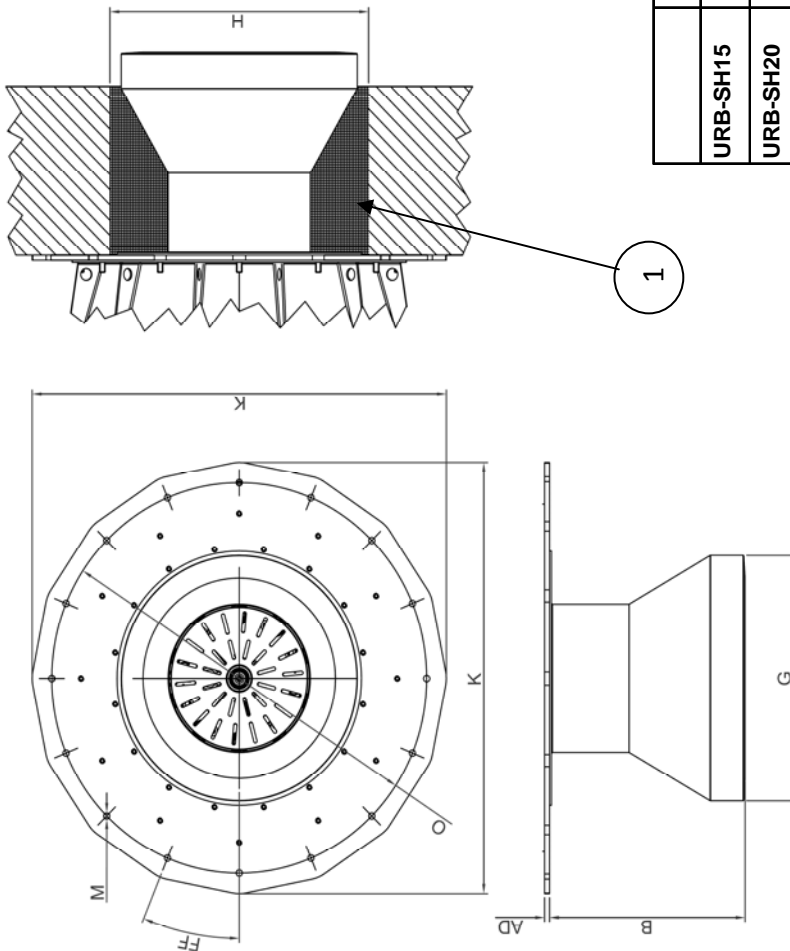
## 9 BURNER DIMENSIONS AND FITTING TO THE BOILER

### ABOUT THE BLAST TUBE CHOICE

Choose the blast tube length follow the instructions of the boiler manufacturer. In absence of these consider the following:

Cast-iron boilers, three pass flue boilers (with the first pass in the rear part): the blast tube must protrude no more than 100 mm into the combustion chamber.

Pressurised boilers with flame reversal: in this case the blast tube must penetrate at least 50 ÷ 100 mm into combustion chamber in respect to the tube bundle plate.



	AD	B	G	H	O	FF	K	M
URB-SH15	15	min. 400	540	570	1100	22,5°	1200	M14
URB-SH20	15	min. 400	600	630	1100	22,5°	1200	M14
URB-SH25	15	min. 500	650	680	1150	22,5°	1271	M14
URB-SH30	15	min. 500	720	750	1150	22,5°	1271	M16
URB-SH35	15	min. 500	800	830	1350	22,5°	1475	M16
URB-SH40	15	min. 600	860	890	1500	22,5°	1600	M16
URB-SH45	15	min. 600	920	950	1500	22,5°	1600	M16

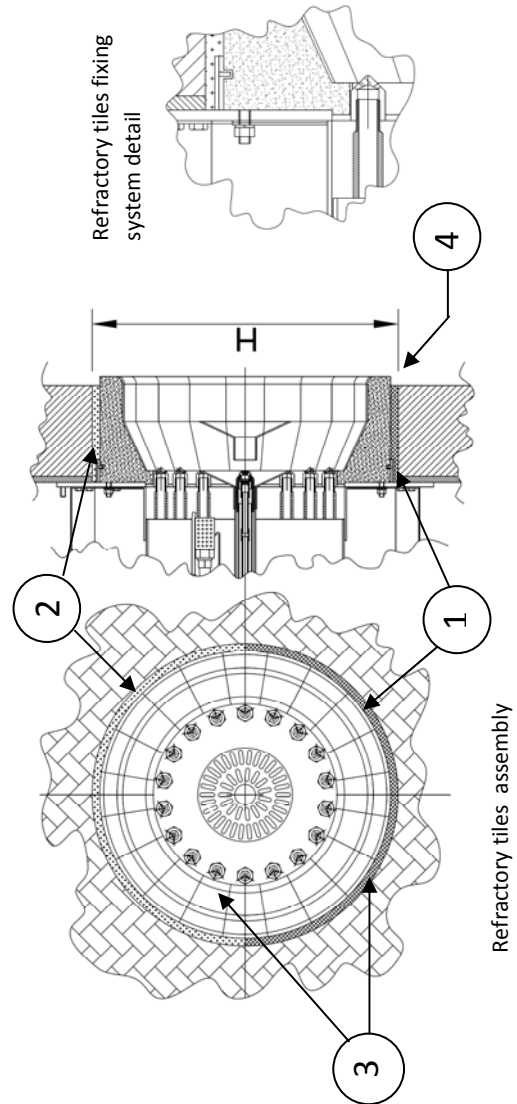
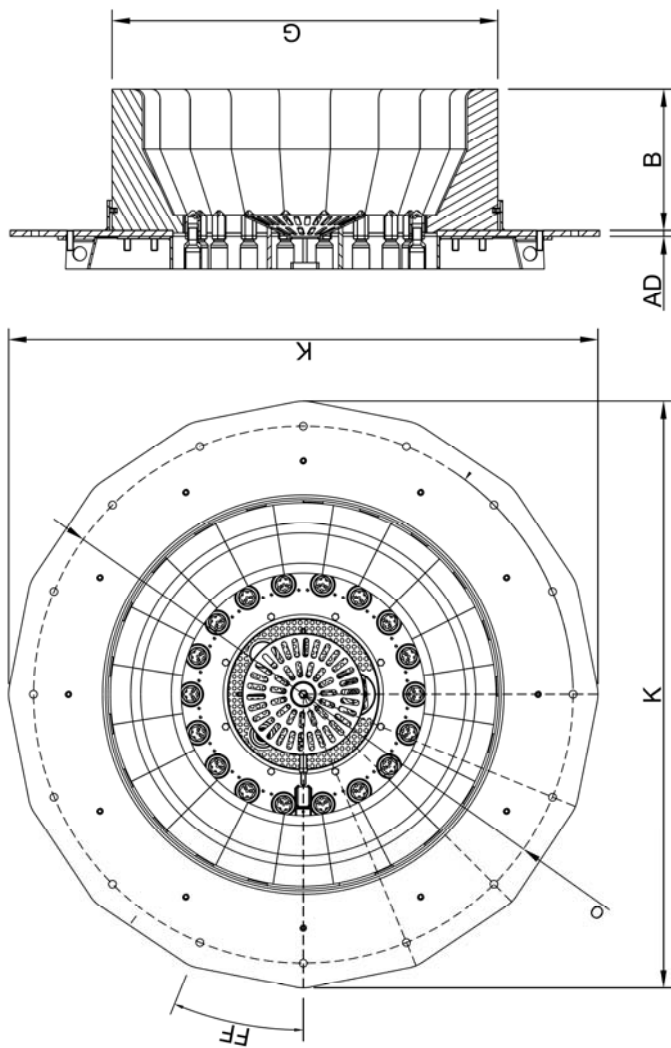
1. Seal with insulation materia the space between the blast tube and the boiler wall

Picture 29 – URB-SH BURNER SERIES  
RECOMMENDED BOILER HOLE DIMENSION & MAIN INSTRUCTION TO FIT THE BURNER TO THE BOILER



### ABOUT THE REFRACTORY INSTALLATION

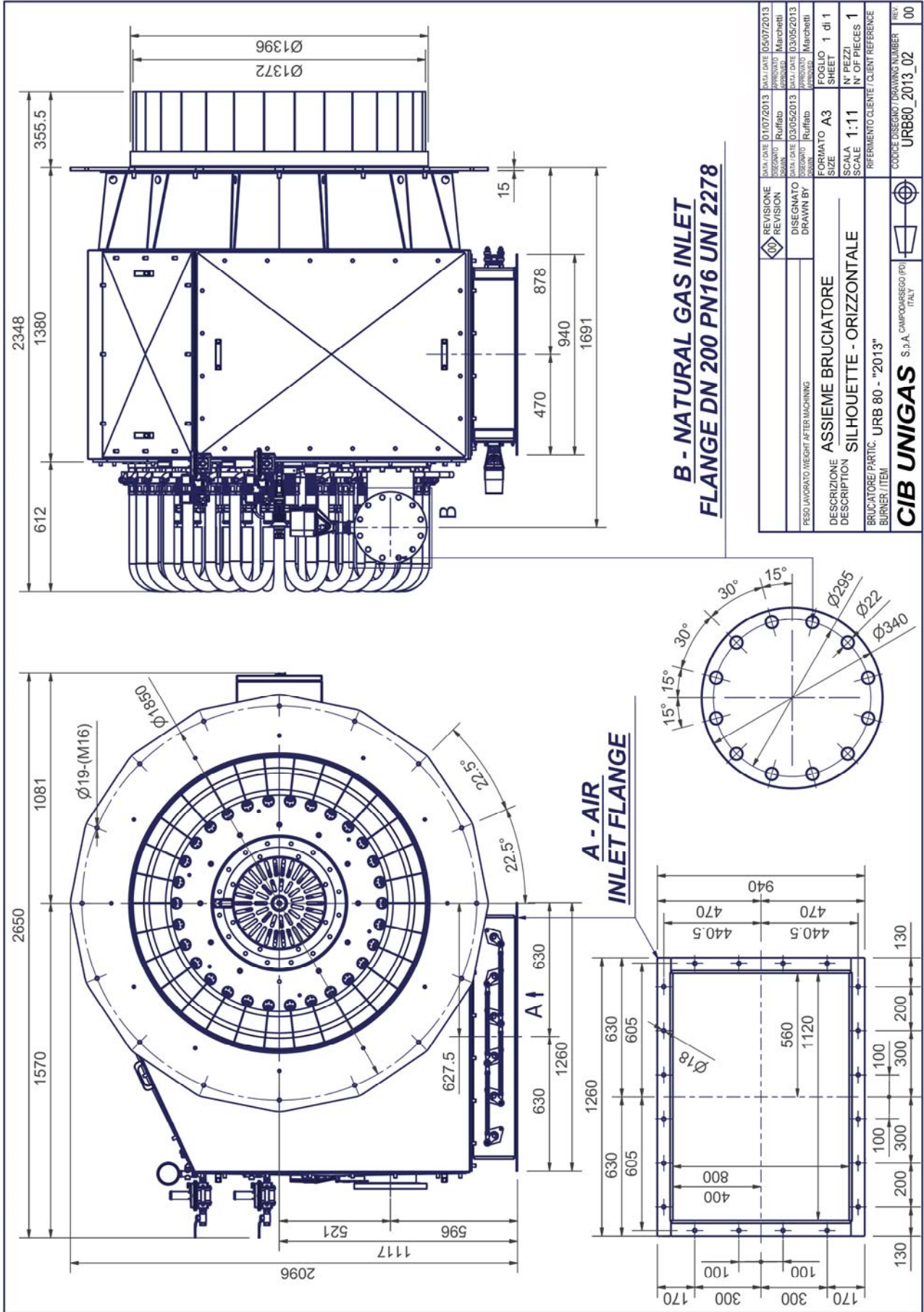
1. Fill with castable or plastic refractory
2. Fill with high temperature insulation
3. Put a 3 mm space between each brick and fill with plastic refractory. The spacer material at point is supplied together with bricks.
4. The refractory blast tube must protrude about 20 mm inside the combustion chamber. No pipes and no refractory material must interfere with the flame development in the furnace.



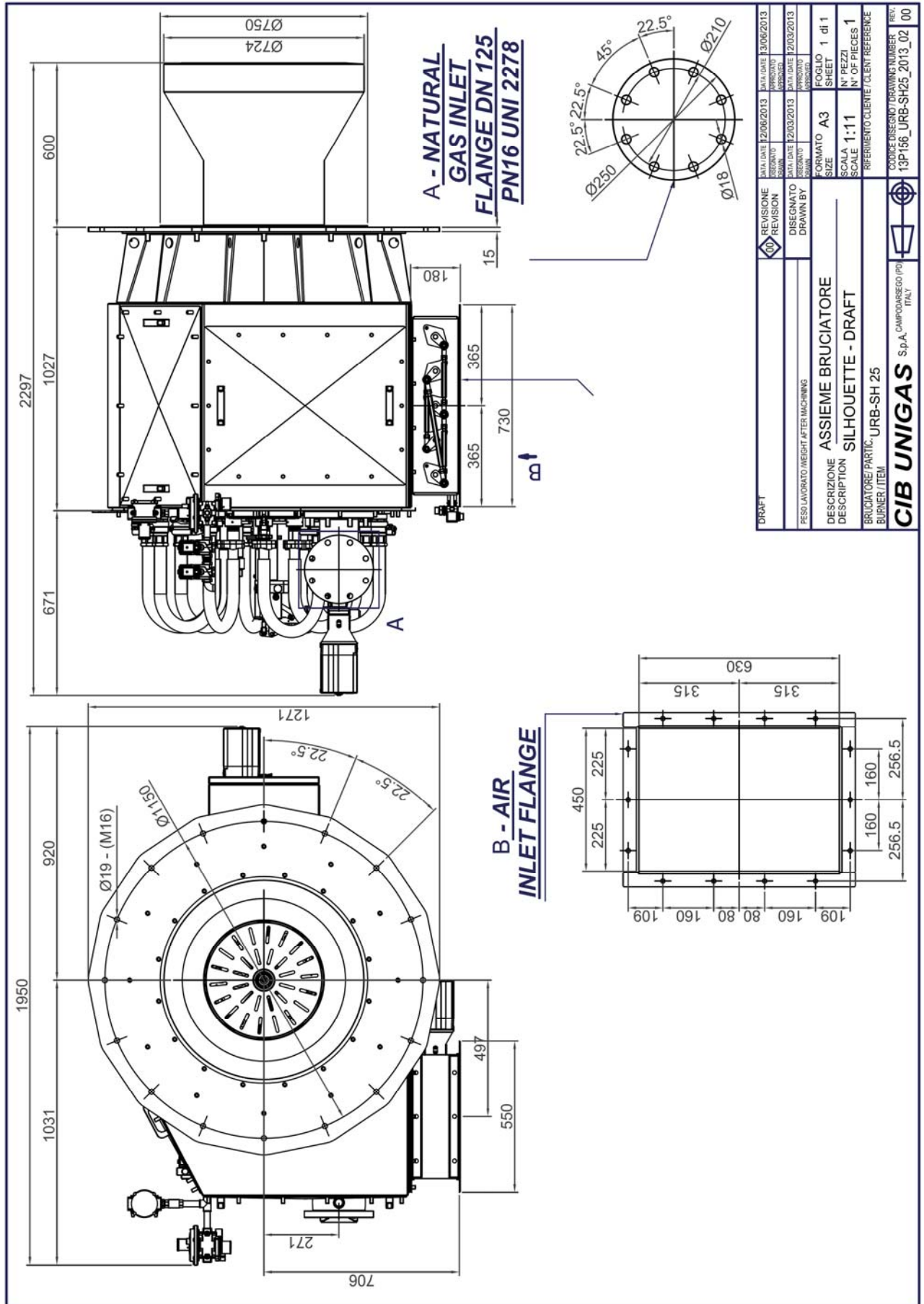
	AD	B	G	H	O	FF	K	M
URB5	15	356	660	710	950	22,5°	1050	M14
URB10	15	356	711	761	95	22,5°	1050	M14
URB15	15	356	762	812	1100	22,5°	1200	M14
URB20	15	356	813	863	1100	22,5°	1200	M14
URB25	15	356	864	914	1150	22,5°	1271	M14
URB30	15	356	914	964	1150	22,5°	1271	M16
URB32	15	356	965	1015	1350	22,5°	1475	M16
URB35	15	356	1016	1066	1350	22,5°	1475	M16
URB40	15	356	1067	1117	1500	22,5°	1600	M16
URB45	15	356	1118	1168	1500	22,5°	1600	M16
URB50	15	356	1168	1218	1650	22,5°	1750	M16
URB60	15	356	1219	1269	1650	22,5°	175	M16
URB70	15	356	1270	1320	1850	22,5°	1960	M16
URB80	15	356	1372	1422	1850	22,5°	1960	M16

Picture 30 – URB BURNER SERIES

RECOMMENDED BOILER HOLE DIMENSION & MAIN INSTRUCTION TO FIT THE BURNER TO THE BOILER

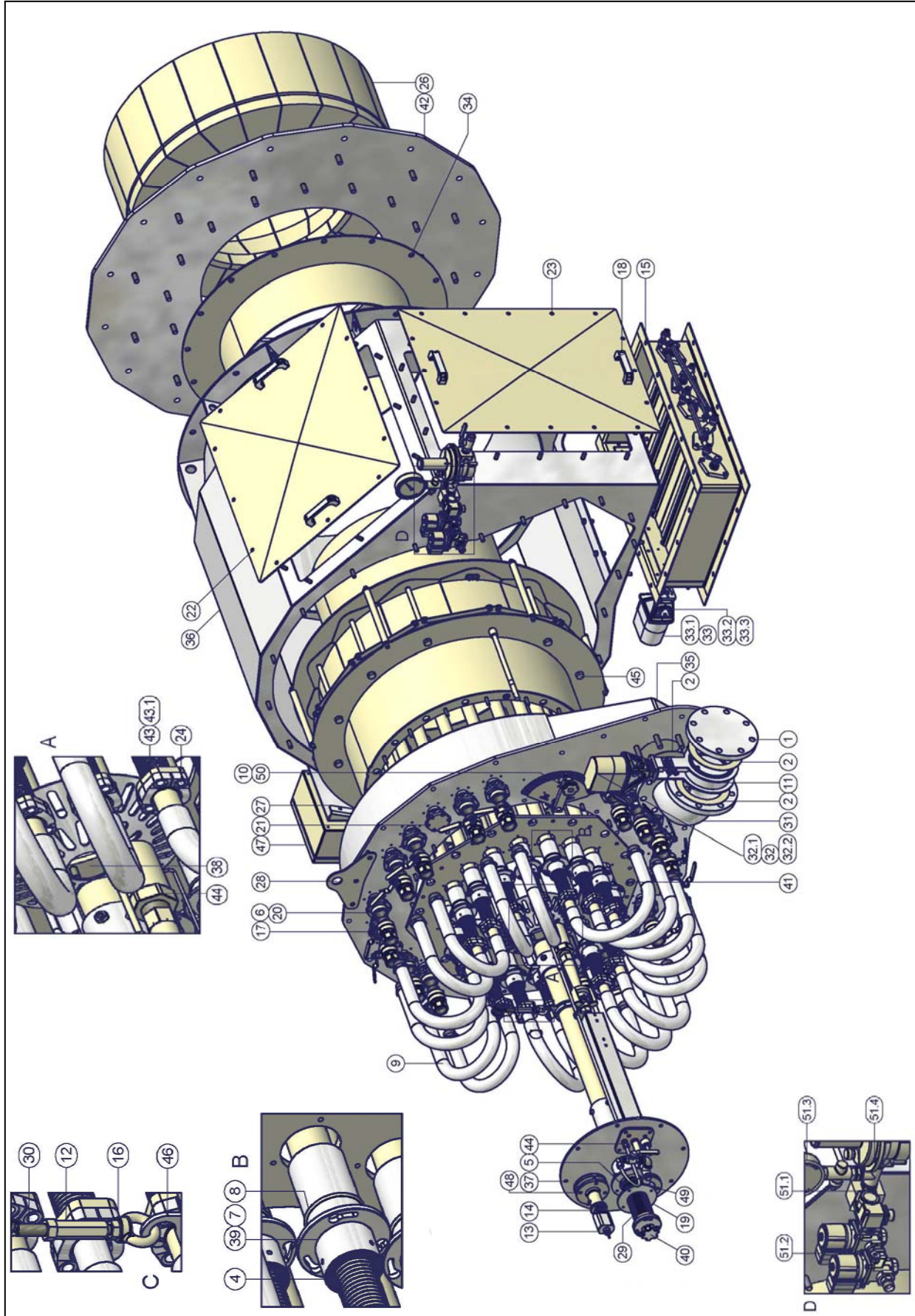


Picture 31 - URB80 silhouette



Picture 32 – URB-SH25 silhouette

# 10 EXPLODED VIEW



Picture 33 – Exploded view, sample: URB32, single register burner type, single fuel

POS	DESCRIPTION	POS	DESCRIPTION
1	FLANGE	31	CURVE
2	GASKET	32.1	ACTUATOR
4	GAS LANCE REFERENCE	32.2	COUPLING
5	O RING	33.1	ACTUATOR
6	O RING	33.2	COUPLING
7	O RING	33.3	STIRRUP
8	O RING	34	REGISTER AIR DUCT
9	FLEXIBLE HOSE	35	GAS RING
11	BUTTERFLY VALVE	36	WINDBOX
12	BEAM	37	DISC
13	PHOTOCELL	38	DIFFUSER
14	PHOTOCELL PLUG	39	HOLDER
15	AIR DAMPER	40	CUP
16	BRACKET	41	REGISTER
17	MANUAL VALVE	42	BURNER FRONT PLATE
18	HANDLE	43	GAS LANCE
19	FLANGE	43.1	NOZZLE
20	FLANGE	44	PILOT
21	FLANGE	45	REGISTER
22	INSPECTION DOOR	46	LANCE HOLDER
23	INSPECTION DOOR	47	JUNCTION BOX
24	FLANGE	48	PHOTOCELL BRACKET
26	REFRATORY TILES	49	INSPECTION WINDOW
27	BRACKET	50	KNOB
28	STIRRUP	51.1	PRESSURE SWITCH
29	BRACKET	51.2	SOLENOIDE VALVE
30	COUPLING	51.4	GAS GOVERNOR WITH FILTER

**Table 8 – Correspondence between the exploded view position numbers and parts**

# 11 BURNER MANAGEMENT SYSTEM

## 11.1 Combustion Safety Controls

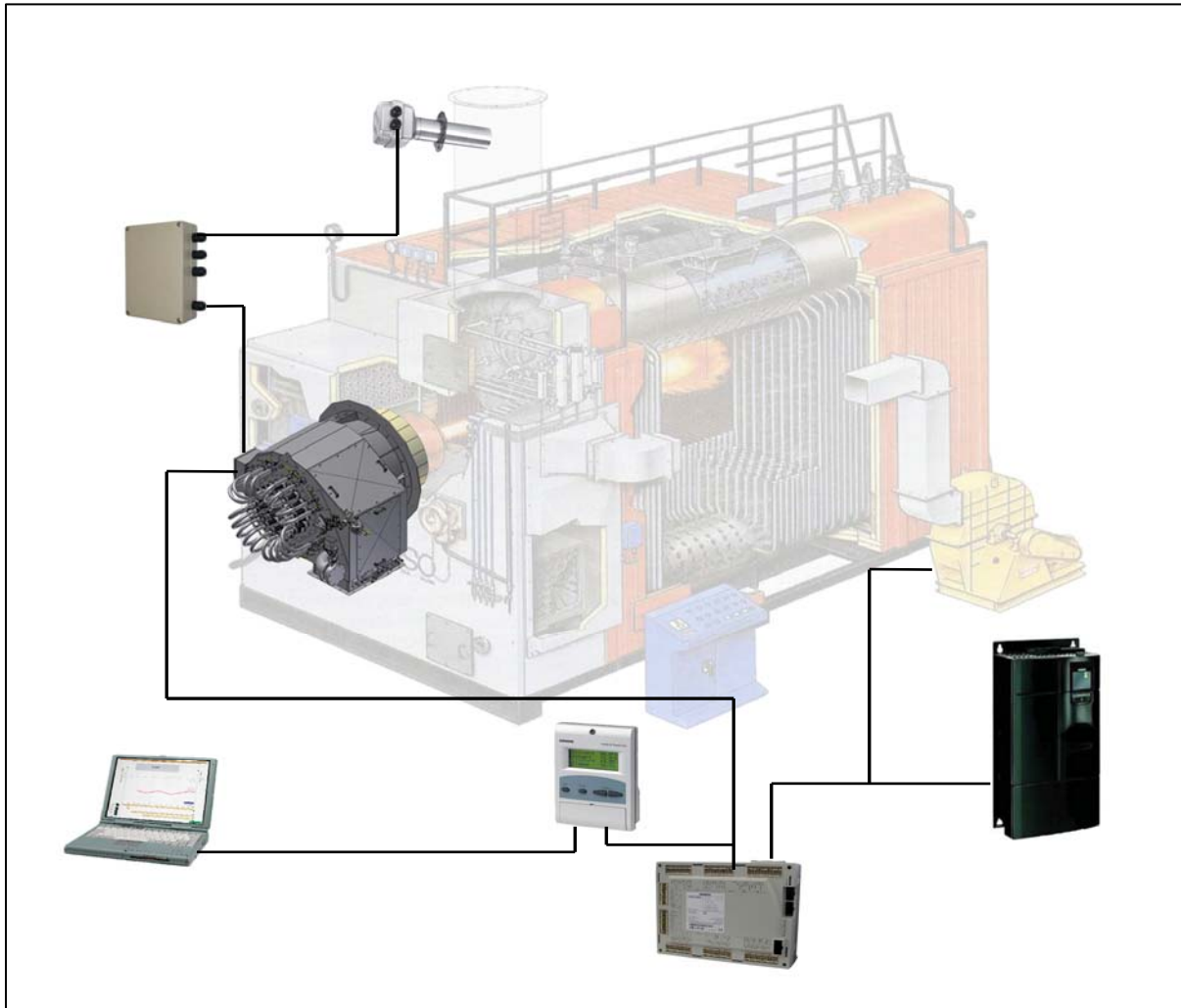
The forced draft package burner safety control system provides continuous monitoring of the firing operation and of the burner safety.

A pre-purge of adequate air changes occurs followed by pilot ignition and main flame ignition at the minimum fire position. The micro-processor includes a modulator to control the fuel metering valves and the air damper positions in all the step of the burner operation.

A change in the boiler medium characteristics immediately results in a corresponding change of fuel and air input into the burner to maintain constant that medium property in the boiler. The temperature/pressure probe or the plant PLC send the modulation input signal (point, analogue or Bus signal are allowed) to the burner control box.

The shut-down sequence is still under the BMS control as well as the no flame phase. The photocell must no see any flame when there should not.

The burner firing rate can also be adjusted manually from a remote control station located in the burner control cabinet, when so desired. With this system, the forced draft fan can be located at a distance from the burner.



Picture 34 – LMV principle

CIB UNIGAS standards supply includes a remote control panel with the command logic of the burner and its fuel trains. Supplied loose devices can be provided at the needs.

The burners are supplied with an on board junction box, including electrical connections and the ignition transformer for the gas pilot burner.

The whole supply is factory tested before the shipment.

## **11.2 Integrated functions:**

1. Burner control;
2. Power regulator;
3. Gas valve leakage control system;
4. Oxygen control;
5. Inverter control;
6. Dialogue with remote PLC (MOD Bus – Analogue I/O);
7. Burner commissioning and configuration via display or PC-tool;
8. Simple programming with PC-tool;
9. Complete self-diagnostic function (error memory, number of firings, burner operation time, clock...);
10. 3 levels of parameter access with password: (manufacturer, Servicing personnel, final user);
11. Remote diagnostics;
12. All components can be easily interchanged;
13. Parameter upgrading with PC-tool;

## **11.3 Benefits of an electronic burner control with inverter and oxygen probe.**

The position of all the flow metering valves (for air or fuel) is adjusted by means of a dedicated servomotor, directly coupled on each valve. Mechanical linkages are totally avoided and the system is able to ensure:

- more accuracy in the burner regulation;
- high repeatability over time in the servomotors positioning.

These advantages allow the burner to save costs in terms of fuel consumption and regulation adjustments during the burner life.

The economic savings can be increased by combining the electronic system with the control of the fan motor speed and the control of the O<sub>2</sub> or CO content in the flue gas at the boiler stack.

In this way the burner is no longer considered a part of the plant, but it becomes one with it, integrating with all the monitoring systems and enabling the operator to manage all the users from a single remote control panel.

Error and alarms, position of servomotors, load percentage at input or output, temperature/pressure values, O<sub>2</sub> values in the smoke, flame intensity are some of output signals that the electronic burner management system can exchange with other controllers.

## 12 BURNER APPLICATION EXAMPLES

### 12.1 Application

The URB burner is engineered for application to package or field erected boilers and heaters.

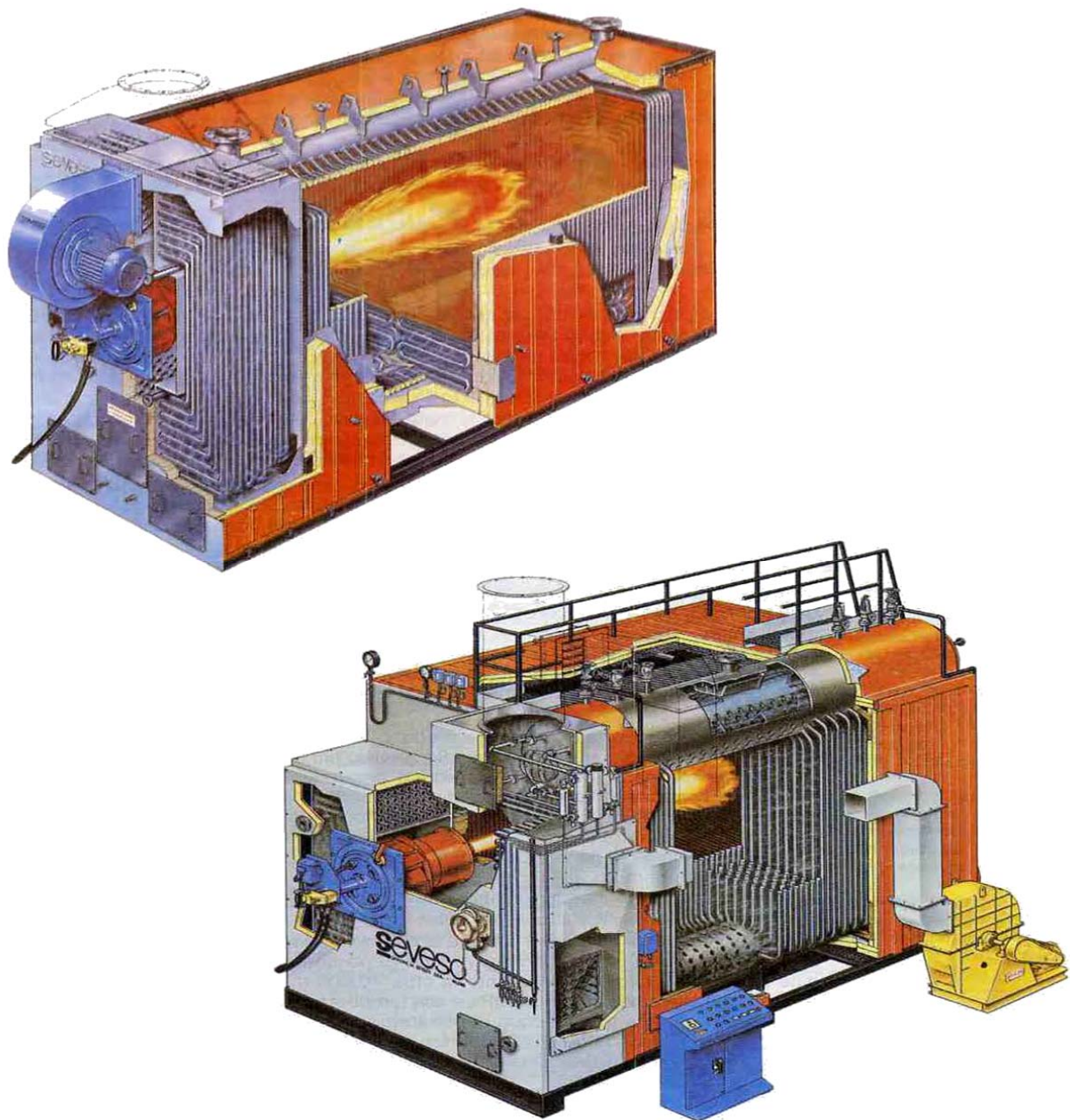
This forced draft burner can be adapted to the firing of air heaters and dryers.

It can replace multiple burners on many boiler or heater conversions, resulting in improved operating efficiencies.

The modular design permits utilization of existing power plant equipment such as blowers, combustion air pre-heaters, boiler feed water controls, draft controls and annunciators.

On boilers with extremely wide furnaces, multiple burners can be incorporated in a single package system.

The package burner system can be utilized for both vertical and horizontal firing.



Picture 35 - Examples for URB series with ambient and hot combustion air, on water pipe boiler



## 12.2 Some references for URB series

<p><b>China – Urumqi district heating</b></p> <p><b>Boiler manufacturer:</b></p> <ul style="list-style-type: none"><li>• Harbin Hong Guang Boiler Group Co.,LTD</li><li>• Hot water – size 80 t/h</li></ul> <p><b>Burners type:</b> URB70 – 3 units – since 2013</p> <p><b>Main features:</b></p> <ul style="list-style-type: none"><li>• Fuel: natural gas</li><li>• Electronic cam with O2 and VSD control</li><li>• Remote control panel</li></ul> <p><b>Emission values:</b></p> <ul style="list-style-type: none"><li>• NOx &lt; 120 mg/kWh</li><li>• CO = 0 ppm</li></ul>	
<p><b>China – Urumqi district heating</b></p> <p><b>Boiler manufacturer:</b> China Nuclear Equipment Company Co.,LTD Hot water - size 100 t/h – 80 t/h</p> <p><b>Burners type:</b> URB80 – 3 units – since 2012 URB70 – 3 units – since 2012</p> <p><b>Main features:</b></p> <ul style="list-style-type: none"><li>• Fuel: natural gas</li><li>• Electronic cam with O2 and VSD control</li><li>• Remote control panel</li></ul> <p><b>Emission values:</b></p> <ul style="list-style-type: none"><li>• NOx &lt; 120 mg/kWh</li><li>• CO = 0 ppm</li></ul>	
<p><b>China – Urumqi district heating</b></p> <p><b>Boiler manufacturer:</b></p> <ul style="list-style-type: none"><li>• Harbin Hong Guang Boiler Group Co.,LTD</li><li>• Hot water – size 80 t/h &amp; 40 t/h</li></ul> <p><b>Burner types:</b></p> <ul style="list-style-type: none"><li>• URB70 – 2 units – since 2012</li><li>• URB32 - 1 units – since 2012</li></ul> <p><b>Main features:</b></p> <ul style="list-style-type: none"><li>• Fuel: natural gas</li><li>• Electronic cam with O2 and VSD control</li><li>• Remote control panel</li></ul> <p><b>Emission values</b></p> <ul style="list-style-type: none"><li>• NOx &lt; 120 mg/kWh</li><li>• CO = 0 ppm</li><li>•</li></ul>	

**Italy - NAR S.p.A. – Packaging plant**

**Boiler manufacturer**

**Burner:**

URB30

**Main features:**

- Fuel: natural gas & diesel
- Electronic modulation

Xxxxx

Xxxxx



**Ukraine – Slavutych distric heating**

**Boiler manufacturer:**

KV-GM-58

**Burner:**

URB30 – 2 units

**Main features:**

- Fuel: natural gas / diesel
- Two burner in the same furnace
- Fully modulating: electronic cam
- Remote control panel



**China – Wuhan  
Master Kong Beverage**

**Boiler manufacturer:**

Harbin Hong Guang Boiler Group Co.,LTD  
2 units – 40 t/h each one

**Burner type:**

URB15: (2+2 units on 2 boilers)

**Main features:**

- Fuel: Natural gas
- Electronic cam (Siemens LMV5x)
- Two burners, same combustion chamber
- Protection degree IP54
- Unique for two burners:
- BMS and DCS for two burners
- gas train
- air damper



**France – Russillion  
Rhodia Power Plant**




<p><b>Boiler manufacturer:</b> Babcock Wanson</p> <p><b>Burner:</b> URB10 – 4 units</p> <p><b>Main features:</b></p> <ul style="list-style-type: none"> <li>• Fuel: natural gas / light oil</li> <li>• Register burner</li> <li>• Removable gas lances during burner operation</li> <li>• Protection degree IP54</li> <li>• Fully modulating: electronic cam</li> <li>• Remote control panel</li> </ul>	
<p><b>Ukraine – Khmelnytsky District Eating</b></p> <p><b>Boiler manufacturer</b></p> <p><b>Burner:</b> URB30</p> <p><b>Main features</b></p> <ul style="list-style-type: none"> <li>• Fuel: natural gas &amp; heavy oil</li> <li>• Electronic modulation</li> <li>• Remote control panel</li> </ul>	
<p><b>Pakistan - Power plant</b></p> <p><b>Boiler manufacturer</b> Descon</p> <p><b>Burner:</b> URB30</p> <p><b>Main features</b></p> <ul style="list-style-type: none"> <li>• Fuel: natural gas &amp; heavy oil</li> <li>• Electronic modulation</li> <li>• Remote control panel</li> <li>• Draught fan</li> </ul>	

Table 9 – URB series references

### 12.3 Some references for URB-SH

<p><b>CHINA – ShanDong oil field Sheng Li Oil Field</b></p> <p><b>Boiler manufacturer</b> CNPC8</p> <p><b>Burner:</b> URB-SH25 (new configuration 2013)</p> <p><b>Main features</b></p> <ul style="list-style-type: none"><li>• Fuel: natural gas</li><li>• heavy oil (<math>\leq 4000</math> cSt@50 °C)</li><li>• Tailored made: designed for the client</li><li>• Steam / compressed air atomization</li><li>• Oil field heavy oil directly burned</li><li>• Remote fuel handling units</li><li>• Single head for oil and gas burning</li></ul>	
<p><b>CHINA – Kuitun Sheng Li Oil Field</b></p> <p><b>Boiler manufacturer</b> CNPC8</p> <p><b>Burner:</b> URB-SH30</p> <p><b>Main features</b></p> <ul style="list-style-type: none"><li>• Fuel: natural gas</li><li>• heavy oil (<math>\leq 4000</math> cSt@50 °C)</li><li>• Tailored made: designed for the client</li><li>• Steam / compressed air atomization</li><li>• Oil field heavy oil directly burned</li><li>• Remote fuel handling units</li><li>• Single head for oil and gas burning</li></ul>	
<p><b>CHINA – ShanDong oil field Sheng Li Oil Field</b></p> <p><b>Boiler manufacturer</b> CNPC8</p> <p><b>Burner:</b> URB-SH25 (new configuration)</p> <p><b>Main features</b></p> <ul style="list-style-type: none"><li>• Fuel: natural gas</li><li>• heavy oil (<math>\leq 4000</math> cSt@50 °C)</li><li>• Tailored made: designed for the client</li><li>• Steam / compressed air atomization</li><li>• Oil field heavy oil directly burned</li><li>• Remote fuel handling units</li><li>• Single head for oil and gas burning</li></ul>	

**CHINA – ChongQing  
Jian Feng Chemic Plant**

**Boiler manufacturer:**  
San Jie Boiler Co.,LTD.  
Melt salt boiler

**Burner:**  
URB-SH30

**Main features:**

- Fuel: natural gas
- Fully modulating: electronic cam
- VSD control
- O<sub>2</sub> trim control
- Continuous pilot 1 MW
- Vertical installation
- Hot combustion air up to 250 °C
- Remote control panel



**Table 10 – URB-SH series references**







*C.I.B. Unigas S.p.A.* Via L. Galvani,9 35011 CAMPODARSEGO (PD) - ITALY  
Tel. +39 0499200944 – Fax +39 0499200945  
Internet: [www.cibunigas.it](http://www.cibunigas.it) - email: [cibunigas@cibunigas.it](mailto:cibunigas@cibunigas.it)

Note: specifications and data subject to change without notice. Errors and omissions excepted.