Ecoflam

DUOBLOCK RANGE

TS

www.ecoflam-burners.com

ECOFLAM

THE COMPANY

Our proposal

Ecoflam offers a full range of blown air pressure jet burners granting high efficiency and reliable operation with significant energy savings. All models feature extreme ease of installation maintenance and flexible boiler–burner matching.
All products are conform to CE standards and are manufactured in accordance with ISO 9001(quality management system), ISO 14001 (environmental management) and OHSAS 18001 (occupational health and safety management).

Our expertise

Thanks to its strong attitude in customization, besides its wide range of standard burners for all fuels, Ecoflam boasts many different solutions for different applications.

For more than 40 years, Ecoflam has been working continuously on new developments and the optimisation of existing products. The Ecoflam philosophy of continuous development, implemented in our laboratories, allows us to go forward and produce better results, such as the reduced NOx level emissions.

HEATING · INCINERATORS & WASTE · AGRICULTURE · ASPHALT & BUILDING · TEXTILE DRYING · FOOD PRODUCTION · WOOD BOILERS · CHEMICAL PLANTS · ENGINEERING · PLANT MODERNIZATION

Our worldwide network

Manufacturing is carried out in the factory of Resana (Treviso - Italy) and products are distributed worldwide thanks to a wide network of partners. In fourty years, Ecoflam has been capable to build loyal partnerships and today can count on reliable Partners in more than 60 Countries.
You can fully trust in our partners, they distribute Ecoflam products in their Countries of competence, they have good knowledge of the products, they are well trained under the technical point of view and they carry out commissioning and service by keeping constantly in touch with the headquarter.

TS RANGE

INDEX

Burner designation

RANGE
BLU: gas
MAIOR: light oil
OILFLAM: heavy oil
MULTICALOR: dual fuel (gas/light oil)
MULTIFLAM: dual fuel (gas/heavy oil)

NOx EMISSIONS
- = class 1 or class 2
LN = class 3 (EN676/EN267)

OUT OF STANDARD CONFIGURATIONS
O = Version for OEM
S4 = 4-head configuration
SW = Blast tube with swirl
HT = High temperature version
CV = Continuous ventilation
FGR = Flue gas recirculation
S = Out of standard burner

FUEL TYPE
BF = Biofuel
HV = High viscosity oil up to 50°E at 50°C
LPG = LPG
K = Kerosene

MULTICALOR TS 1200.1 LN PR TC HT LPG 380-60

SIZE (rough output)
Gas: in **kW**
Oil and dual fuel: in **kg/h**

OPERATION TYPE
AB = 2 stages
PR = 2 stage progressive mechanical
PRE = 2 stage progressive electronic
MD = modulating with PID

HEAD LENGHT
TC = short
TL = long

ELECTRICAL POWER SUPPLY
- = Standard configurations:
1 phase: 230V - 50Hz
3 phase: 400V-50Hz
230V 50-60 = 230V - 50-60Hz
380-60 = 380V - 60Hz
460-60 = 460V - 60Hz

Gas train designation

MANUFACTURER
D = Dungs
K = Kromschröder
S = Siemens

VALVE MODEL *(Examples)*
MBDLE415 = MultiBloc model MB-DLE 415
VGD20503 = Siemens model VGD 20.503
VCS240 = Kromschröder model VCS240

VALVE NOMINAL DIAMETER (Examples)
Threaded connection:
RP40 = Rp 1"1/2
RP50 = Rp 2"
Flanged connection:
DN65 = DN65
DN125 = DN125

OTHER DEVICES (empty if not applicable)
F = Filter included (either as a component or included in the regulator)
G = Governor
A = Anti-vibration joint
M = Manual valve

GT - S2 - VGD40 - DN80 PS2

VALVE FEATURES
1 = Valve with built in pressure governor
2 = Two-stage valve with built in pressure governor
3 = Valve without built in pressure governor

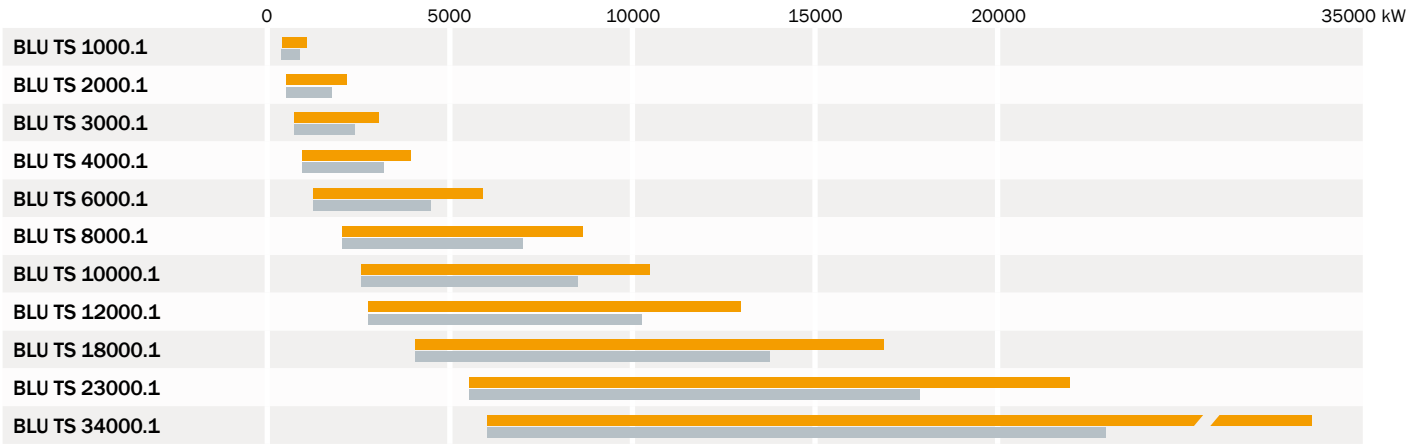
GAS PRESSURE SWITCH ARRANGEMENT
PS1 = Single gas pressure switch upstream of the first shutter
PS2 = Single pressure switch between the two shutters
PS3 = Two minimum gas pressure switches, before and between the valves

TS RANGE

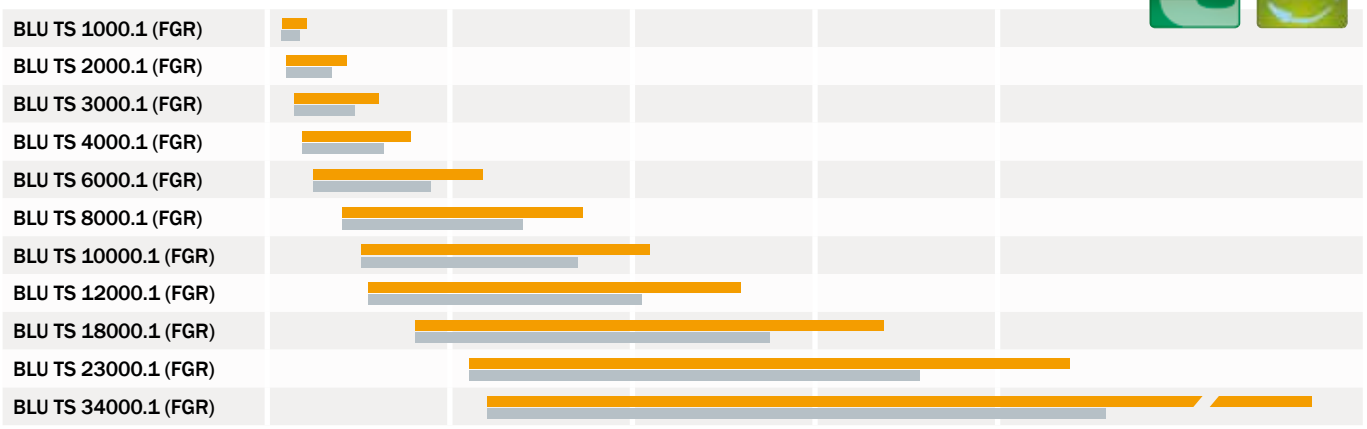
RANGE OVERVIEW

BLU

Natural gas - Low NOx Class 2 (< 120 mg/kWh)



Gas - Low NOx Class 3 (< 80 mg/kWh) / ULTRA Low NOx (< 30 mg/kWh)



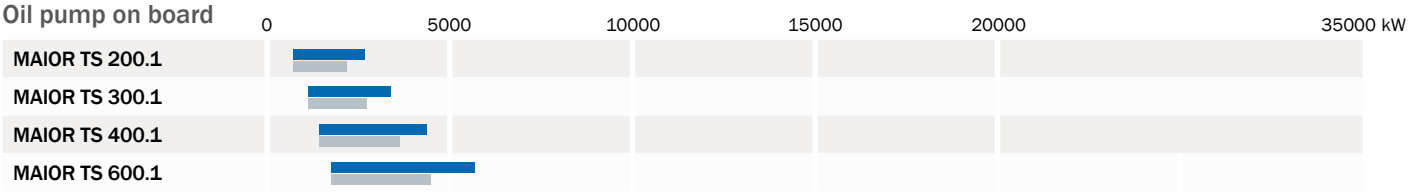
Standard version T_{air} = 20 °C Hot air version T_{air} = 200 °C

NOTE: maximum power of Ultra low NOx models depends on FGR percentage
Two stages and two stage progressive mechanical versions are available on request

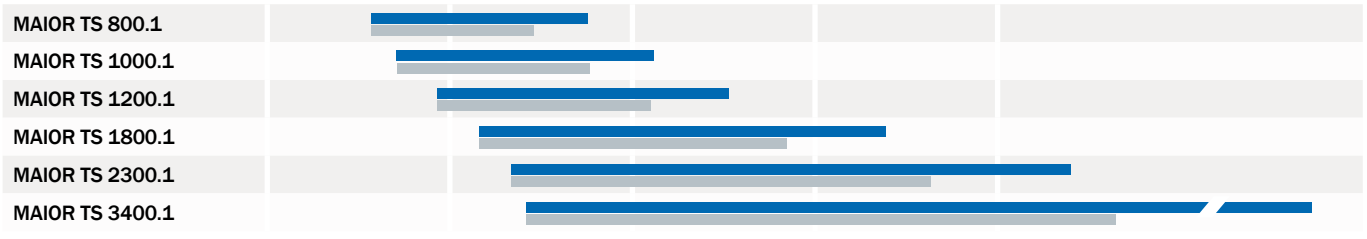
MAIOR

Light oil - Low NOx Class 2 (< 185 mg/kWh)

Oil pump on board



Separated oil pumping unit (not included)



Standard version T_{air} = 20 °C Hot air version T_{air} = 200 °C

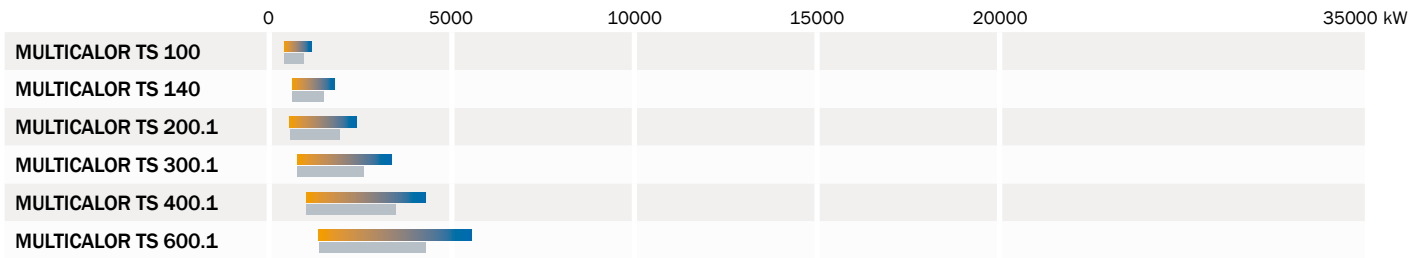
TS RANGE

RANGE OVERVIEW

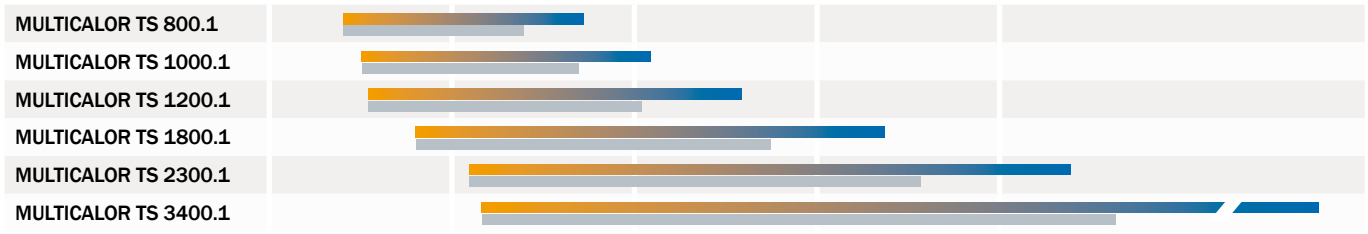
MULTICALOR

Natural gas/light oil

Oil pump on board



Separated oil pumping unit (not included)

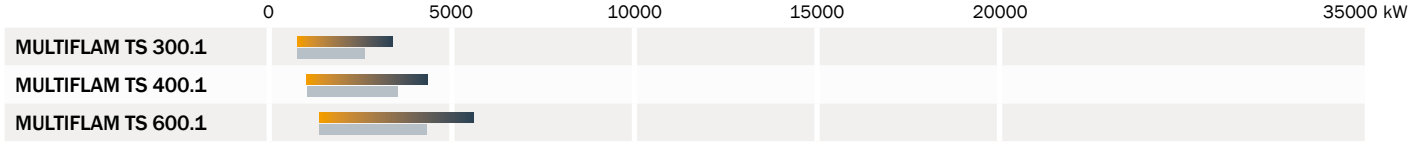


Standard version T_{air} = 20 °C Hot air version T_{air} = 200 °C

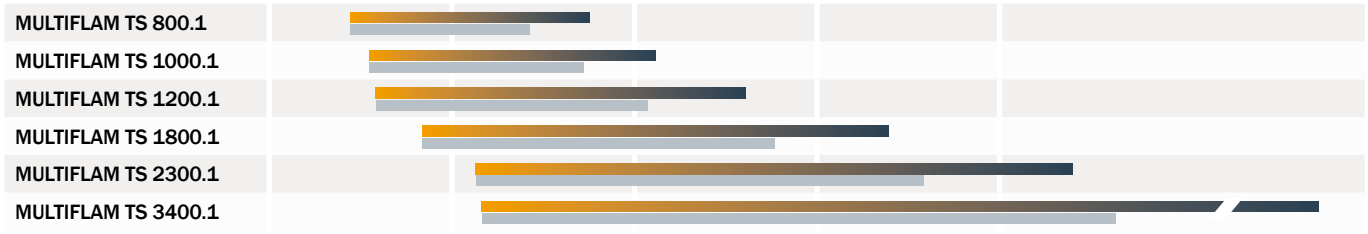
MULTIFLAM

Natural gas/heavy oil - max viscosity 50 °E at 50 °C

Oil pump/heater on board



Separated oil pumping unit (not included)



Standard version T_{air} = 20 °C Hot air version T_{air} = 200 °C

TS RANGE

MAIN CHARACTERISTICS

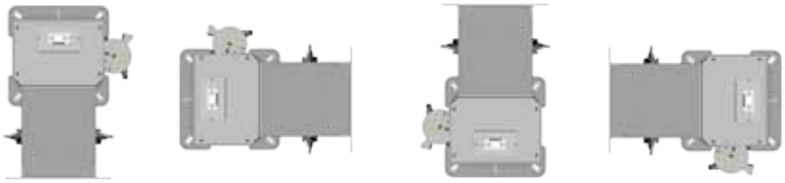
All the benefits of the separate ventilation

In contrast to monoblock burners, duoblock burners are made up of two units, or blocks, as the name implies: the burner head with the air inlet, and the separately-installed fan; the two units are connected via an air duct.
The separate installation of the fan offers several benefits:

- the fan can be installed in a separate room, for instance in the cellar; this results in considerably lower noise levels in the boiler room; when the fan is installed in the same room, a fan enclosure can be used to achieve optimum sound absorption, without inhibiting access to the burner;
- less space required in front of the boiler and in the combustion chamber;
- individual fan layout with optimum adaptation of the fan characteristic curve to suit the pressure ratio of the heat generator; this guarantees pulsation-free and stable burner behaviour, even on heat generators with high resistance on the exhaust side;
- combustion air can be pre-heated to increase installation efficiency;
- lower weight loading on the boiler front.

Maximum flexibility for highly customized solutions

Thanks to their extreme flexibility and ease of use TS burners are suitable for all types of installation from 200 kW up to 34 MW.
Terminal block configuration is provided as standard; versions with integrated control panel are available on request.



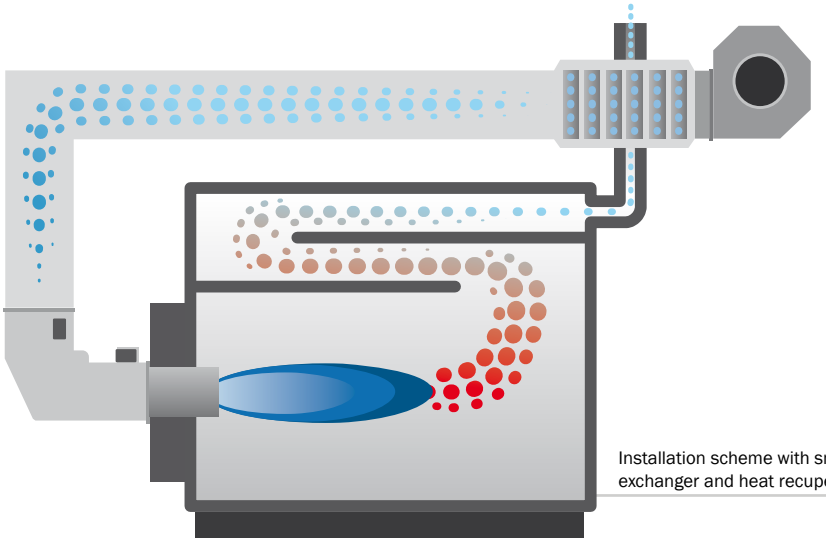
Burners can be assembled with air duct connection in different layouts in order to meet a wide range of specifications in terms of performance and overall dimensions.

Low maintenance, high reliability

All TS range models feature easy maintenance.
Access to the combustion head and to the internal components is allowed from the housing top cover with a single operation, without removing the burner from the boiler.
The clear layout allows rapid cleaning of the mechanical components, keeping the installation always in good conditions.

Hot air configuration

TS range can run in standard configuration with air up to 60 °C.
Versions suitable to work with pre-heated combustion air up to 200 °C can be used in order to achieve greater values of efficiency.



Installation scheme with smoke exchanger and heat recuperator

TS RANGE

CONFIGURATIONS, VARIANTS AND ACCESSORIES

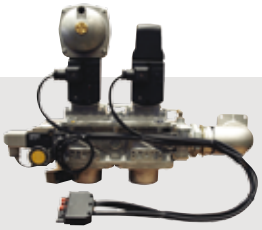
Standard configuration:
loose version with
derivative panel

IP55 Switch cabinet
configuration:
version with assembled
or remote switch cabinet

FGR System

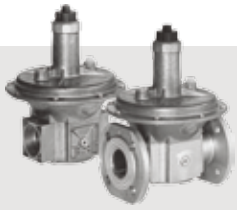
Pre-heating
pump station

Separate ventilator



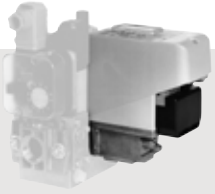
Gas train unit

Modulation Kit

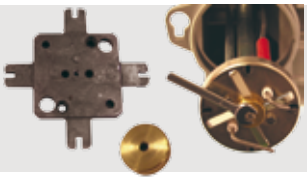


Gas governor/filter
Compulsory EN676

Max pressure switch



Tightness control
Compulsory over 1200 kW

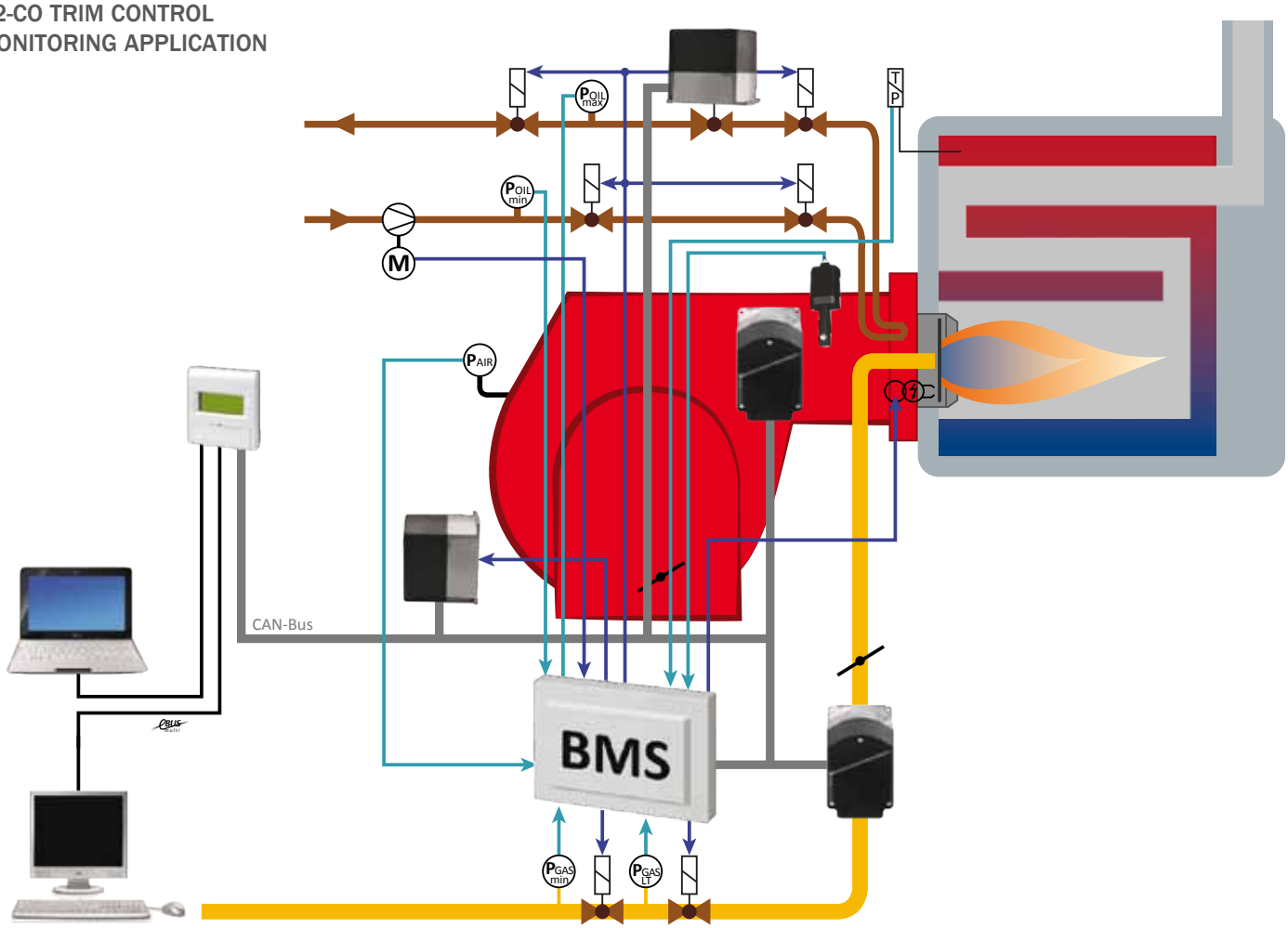


LPG/Natural gas kit

TS RANGE

ELECTRONIC VERSION WITH BMS

INVERTER SYSTEM
O2-CO TRIM CONTROL
MONITORING APPLICATION



BMS (Burner Management System) allows to improve performance and efficiency of modern firing installation. This system is designed to be matched with an extensive range of components such as flame, temperature and pressure sensors, gas valves, variable speed fan motors and oxygen control that can be managed from different bus interfaces

	Turndown ratio			Kit VSD-inverter	Kit O_2-CO trim	Additional functions
	standard	with inverter	oil side			
BLU	1÷6	1÷8	-	Kit	Kit	Flame monitoring sensors Communication interfaces Display interface
MAIOR	-	1÷5	1÷4	Kit	Kit	
OILFLAM	-	1÷4	1÷4	Kit	Kit	
MULTICALOR	1÷6	1÷8	1÷4	Kit	Kit	
MULTIFLAM	1÷6	1÷8	1÷4	Kit	Kit	

HOW TO CHOOSE THE CORRECT VENTILATOR

According to the application output or the fuel flow rate we need to calculate the **air needed** considering the following data:
- Output / Fuel air flow;
- Temperature of combustion air;
- Backpressure in the combustion chamber;
- Sea level altitude.

In order to dimension the correct ventilator the following calculation has to be made:
1. Air flow needed
2. Pressure needed

First of all we need to calculate the air flow needed in function of Nm^3/h for gas or kg/h for oil and multiply it for the following suggested coefficients:
Natural gas: K=12
Light oil: K=15,7
Heavy oil: K=15

Example:
1000 Nm^3/h of gas
The quantity of air will be:
1000 [Nm^3/h] x 12 = 12000 m^3/h of air

This value must be adjusted according to the following:
1. temperature of combustion air (standard 20° C; see table for different temperature);
2. sea level (refer to the table for correction factors);
3. air loss of the connecting pipes between burner head and ventilator (estimated to 5%).

Results will be the following for an installation at 500 m from the sea level and with air at 50°C:
12000 [m^3/h] x 1,05 / 0,855 = 14737 m^3/h

Total air pressure:
to finalize the calculation we shall consider the following factors:
- head loss of the burner* (see following pages);
- backpressure in the combustion chamber;
- additional loss given from accessories like heat exchanger, filters, ...

*: pressure losses calculated at sea level at 20°C; the value must be adjusted according to the correction factor

1000 Nm^3/h gas for BLU 10000.1
10000 kW (L.C.V. 8570 kcal/Nm^3)
- head loss = **35/0,855 = 42 mbar**
- backpressure installation = **15 mbar**
- additional exchanger = **15 mbar**
Total: 42+15+15 = 72 mbar

Final data achieved for selecting the ventilator:
1. Air needed = 14737 m^3/h
2. Pressure = 72 mbar

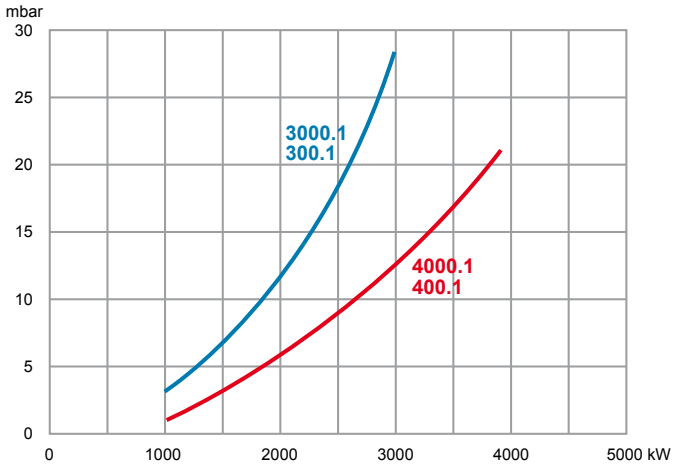
Correction factors

Temp. (°C)	Air density (kg/m)	Sea level altitude (m)												
		0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
0	**1,293**	1,073	1,042	1,012	0,982	0,954	0,926	0,899	0,873	0,847	0,823	0,799	0,775	0,753
5	**1,270**	1,054	1,023	0,993	0,965	0,936	0,909	0,883	0,857	0,832	0,808	0,784	0,761	0,739
10	**1,247**	1,035	1,005	0,976	0,947	0,920	0,893	0,867	0,842	0,817	0,793	0,770	0,748	0,726
15	**1,226**	1,017	0,988	0,959	0,931	0,904	0,878	0,852	0,827	0,803	0,780	0,757	0,735	0,714
20	**1,205**	1,000	0,971	0,943	0,915	0,888	0,863	0,837	0,813	0,789	0,766	0,744	0,722	0,701
25	**1,185**	0,983	0,955	0,927	0,900	0,874	0,848	0,823	0,799	0,776	0,754	0,732	0,710	0,690
30	**1,165**	0,967	0,939	0,911	0,885	0,859	0,834	0,810	0,786	0,763	0,741	0,720	0,699	0,678
40	**1,128**	0,936	0,909	0,882	0,857	0,832	0,807	0,784	0,761	0,739	0,717	0,697	0,676	0,657
50	**1,093**	0,907	0,881	**0,855**	0,830	0,806	0,782	0,760	0,738	0,716	0,695	0,675	0,655	0,636
60	**1,060**	0,880	0,854	0,829	0,805	0,782	0,759	0,737	0,715	0,695	0,674	0,655	0,636	0,617
80	**1,000**	0,830	0,806	0,782	0,760	0,737	0,716	0,695	0,675	0,655	0,636	0,618	0,600	0,582
100	**0,946**	0,786	0,763	0,740	0,719	0,698	0,678	0,658	0,639	0,620	0,602	0,585	0,567	0,551
150	**0,834**	0,693	0,672	0,653	0,634	0,615	0,598	0,580	0,563	0,547	0,531	0,515	0,500	0,486
200	**0,746**	0,619	0,601	0,584	0,567	0,550	0,534	0,519	0,504	0,489	0,475	0,461	0,448	0,434
250	**0,675**	0,560	0,544	0,528	0,513	0,498	0,483	0,469	0,456	0,442	0,429	0,417	0,405	0,393
300	**0,616**	0,511	0,496	0,482	0,468	0,454	0,441	0,428	0,416	0,404	0,392	0,380	0,369	0,359

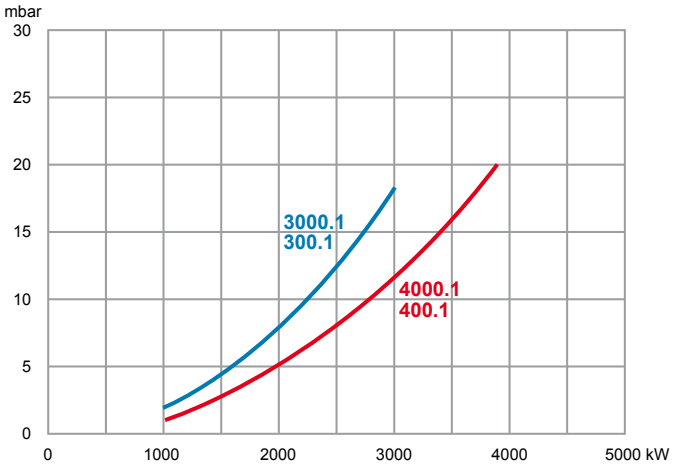
TS RANGE

PRESSURE DROPS

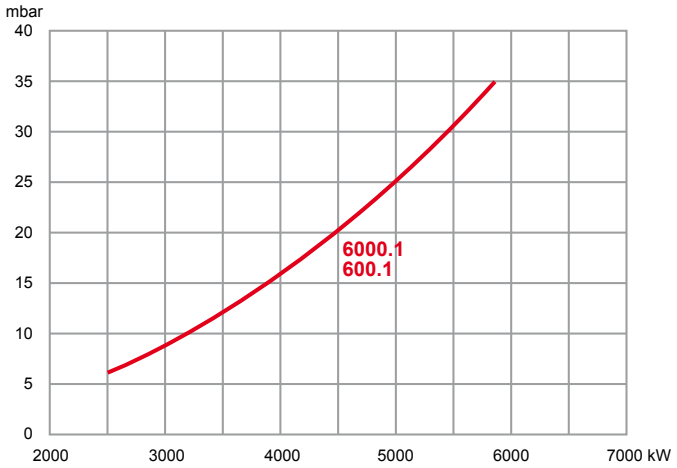
Burner head AIR pressure drop



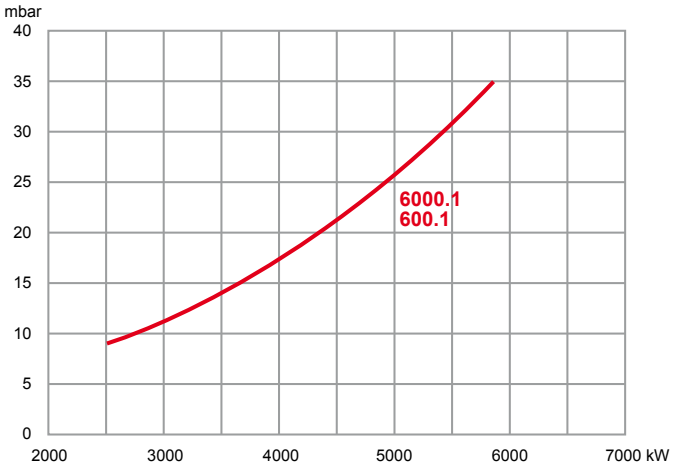
Burner head GAS pressure drop



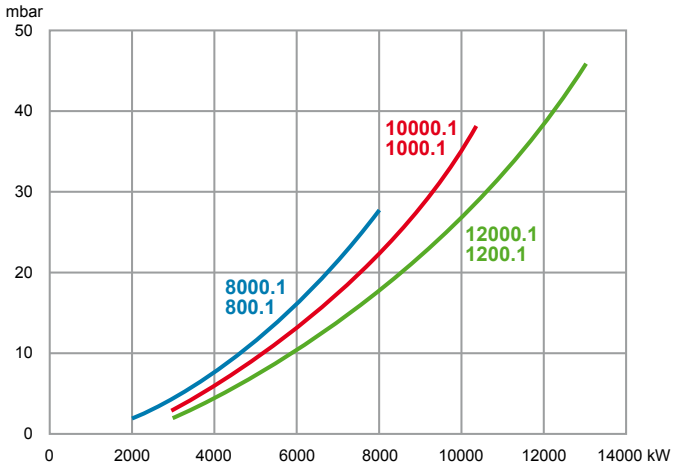
Pressure drop on AIR side



Pressure drop on GAS side



Pressure drop on AIR side



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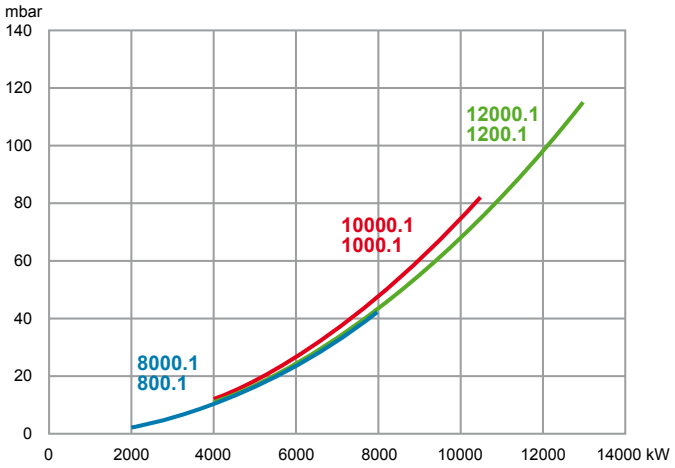
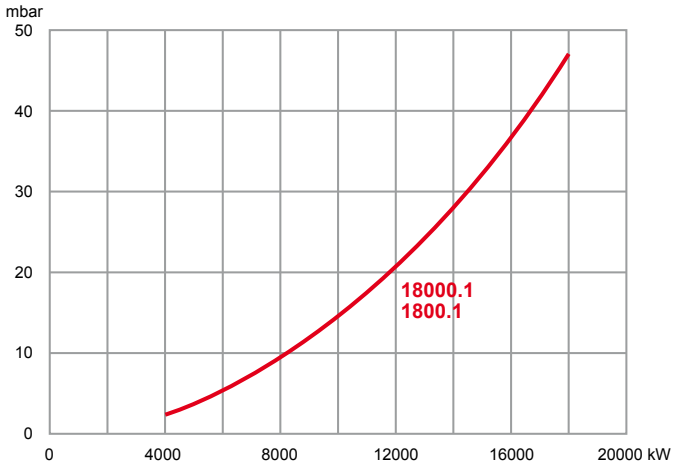
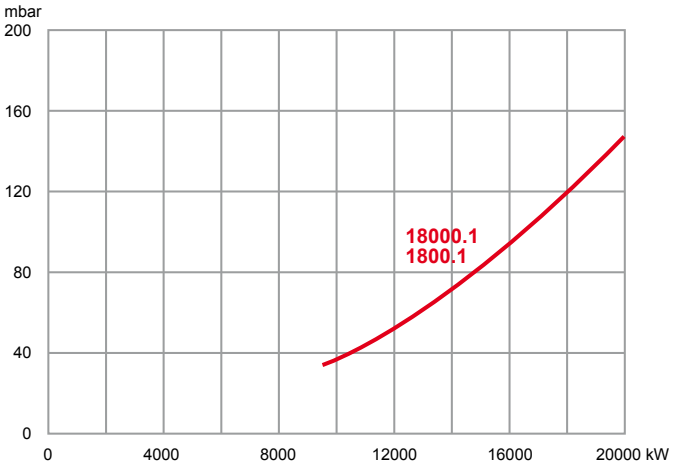


PRESSURE DROPS

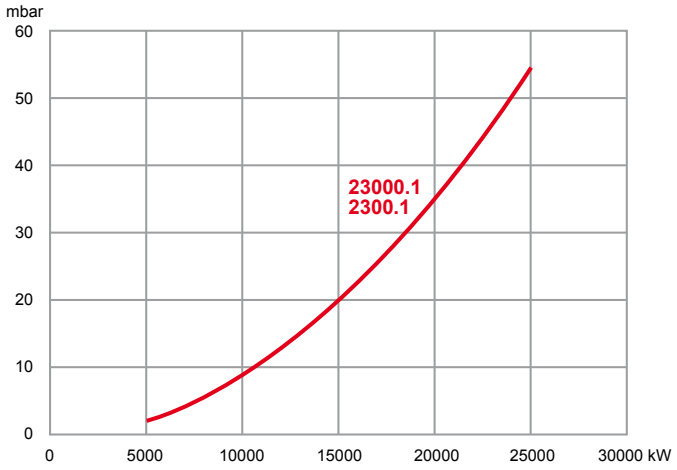
Pressure drop on AIR side



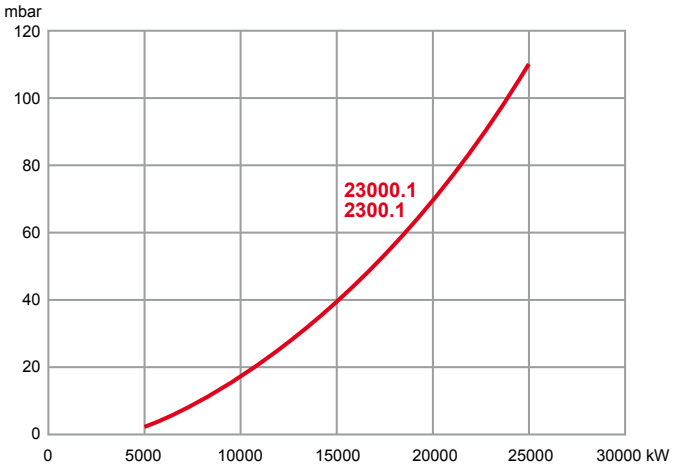
Pressure drop on GAS side



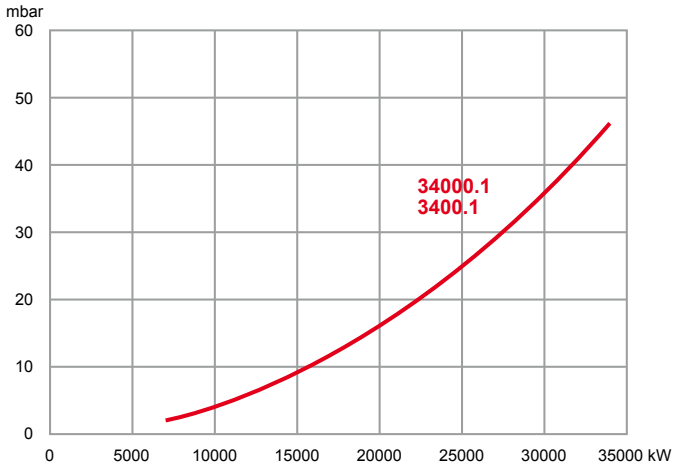
Pressure drop on AIR side



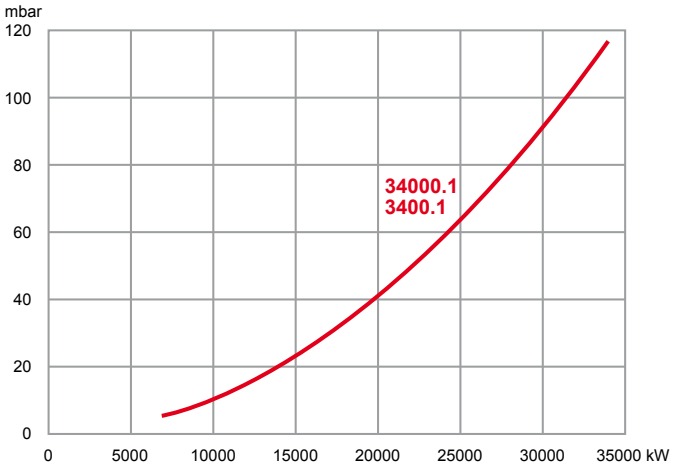
Pressure drop on GAS side



Pressure drop on AIR side



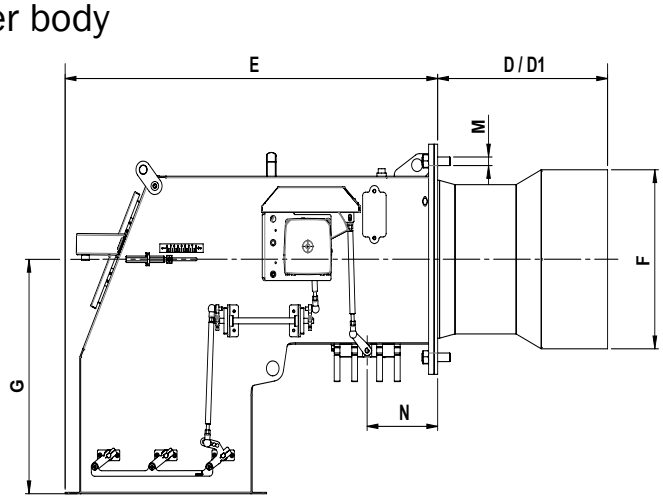
Pressure drop on GAS side

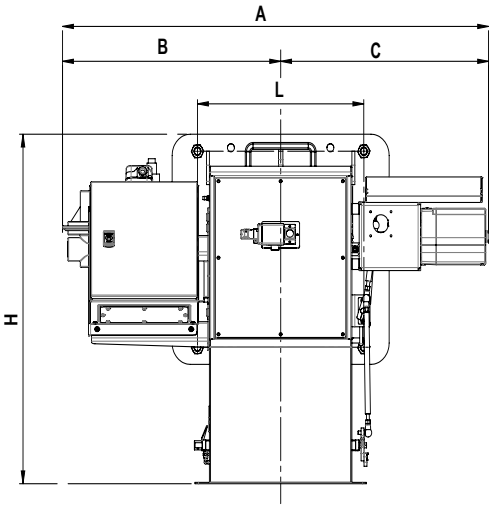


TS RANGE

OVERALL DIMENSIONS - Class 2 models

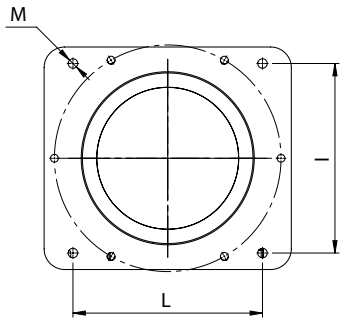
Burner body



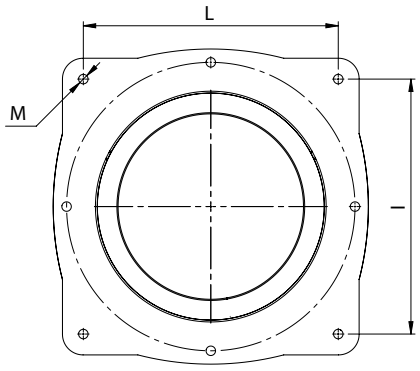


Connecting flange

Gas: TS 500.1 ... 12000.1
Oil and dual: TS 100 ... 1200.1



Gas: TS 1800.1 ... 34000.1
Oil and dual: TS 1800.1 ... 3400.1



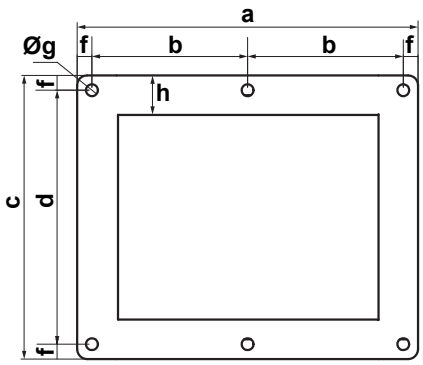
	A	B	C	D	D1	E	F	G	H	I	L	M	N
TS 1000.1 / TS 100	523	216	307	174	394	556	190	290	370	190	190	4xM10	139*
TS 1500.1 / TS 140	523	216	307	342	492	556	200	290	385	190	190	4xM10	139*
TS 2000.1 / TS 200.1	523	216	307	342	492	556	200	290	390	190	190	4xM10	139*
TS 3000.1 / TS 300.1	848	407	441	348	548	669	270	392	568	270	270	4xM16	125
TS 4000.1 / TS 400.1	986	472	514	330	530	763	290	392	575	270	270	4xM16	180
TS 6000.1 / TS 600.1	986	472	514	365	640	775	320	392	587	315	315	4xM16	188
TS 8000.1 / TS 800.1	998	478	520	373	698	838	325	405	614	330	330	4xM16	185
TS 10000.1 / TS 1000.1	1251	633	618	470	770	1030	369	616	976	619	619	4xM20	195
TS 12000.1 / TS 1200.1	1178	603	575	470	770	1030	420	550	820	619	619	4xM20	195
TS 18000.1 / TS 1800.1	1178	603	575	470	770	1030	450	550	820	619	619	4xM20	195
TS 23000.1 / TS 2300.1	1330	620	710	590	710	1480	551	670	1063	619	619	4xM20	200
TS 34000.1 / TS 3400.1	1308	472	836	530	760	1549	720	760	1242	800	800	4xM20	210

*: gas train connection on the right side of the burner
D: short head - D1: long head
Dimensions (in mm) make reference to the electronic versions; data may vary according to the configuration and options installed

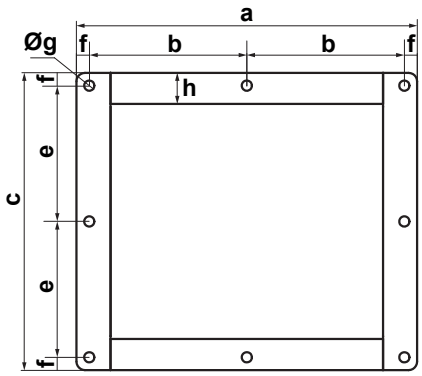
OVERALL DIMENSIONS - Class 2 models

Air duct

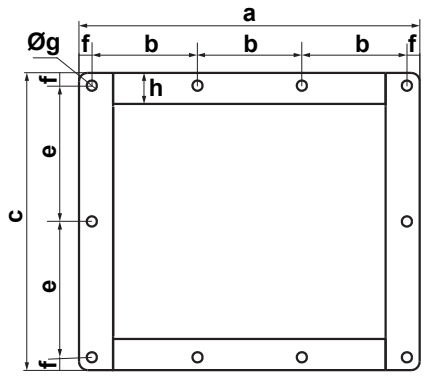
Gas: TS 500.1 ... 2000.1
Oil and dual: TS 100 ... 200.1



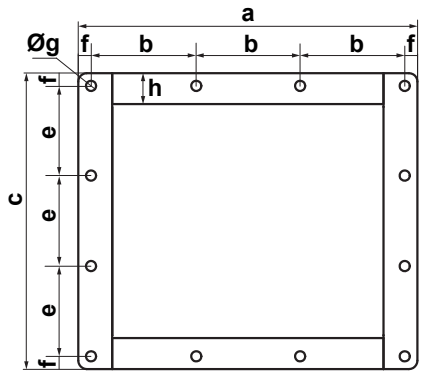
Gas: TS 3000.1 ... 6000.1
Oil and dual: TS 300 ... 600.1



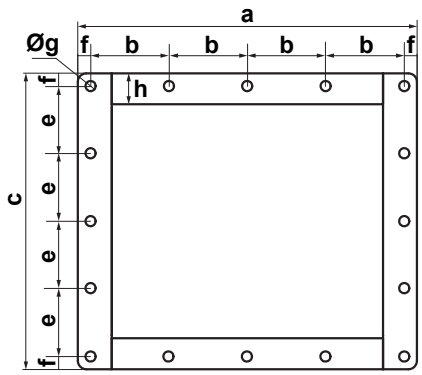
Gas: TS 8000.1 ... 12000.1
Oil and dual: TS 800.1 ... 1200.1



Gas: TS 18000.1
Oil and dual: TS 1800.1



Gas: TS 23000.1 ... 34000.1
Oil and dual: TS 2300.1 ... 3400.1



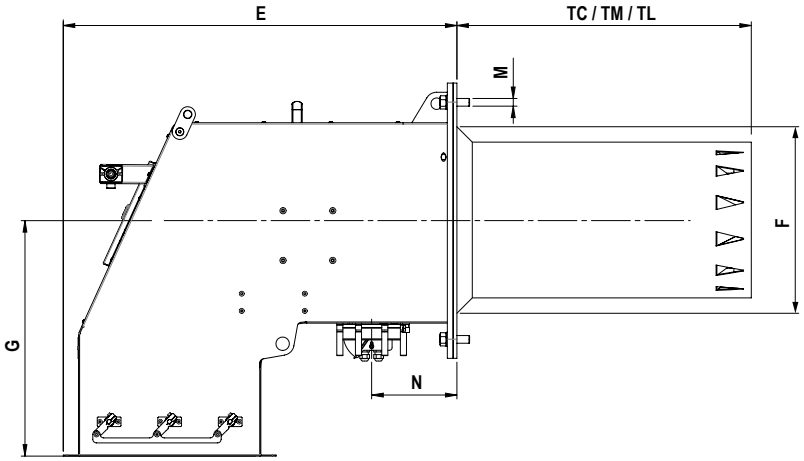
	a	b	c	d	e	f	Øg	h
TS 1000.1 / TS 100	303	136,5	252	222	-	15	6x R12	40
TS 1500.1 / TS 140	303	136,5	252	222	-	15	6x R12	40
TS 2000.1 / TS 200.1	345	157,5	287	257	-	15	6x R12	40
TS 3000.1 / TS 300.1	400	185	349	-	159,5	15	8x R12	40
TS 4000.1 / TS 400.1	400	185	349	-	159,5	15	8x R12	40
TS 6000.1 / TS 600.1	470	220	361	-	165,5	15	8x R12	40
TS 8000.1 / TS 800.1	557	173	474	-	218	19	10x R14	43
TS 10000.1 / TS 1000.1	557	173	474	-	218	19	10x R14	43
TS 12000.1 / TS 1200.1	557	173	474	-	218	19	10x R14	43
TS 18000.1 / TS 1800.1	730	230,7	650	-	204	19	12x R14	43
TS 23000.1 / TS 2300.1	930	223	828	-	197,5	19	16x R14	40
TS 34000.1 / TS 3400.1	930	223	828	-	197,5	19	16x R14	40

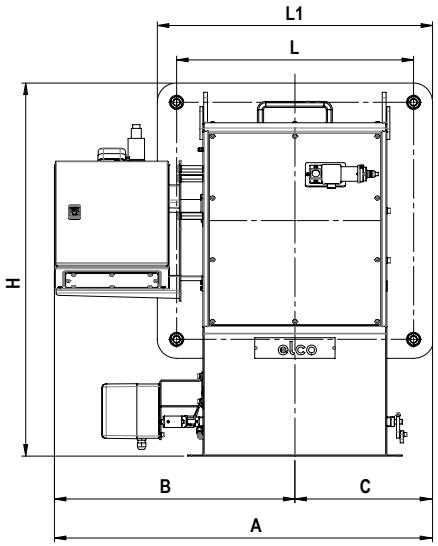
Dimensions in mm

TS RANGE

OVERALL DIMENSIONS - LOW NOx Class 3 models

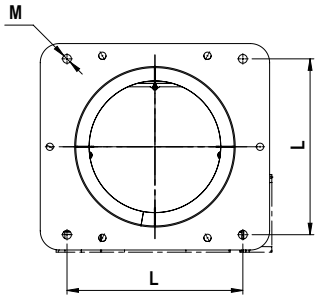
Burner body



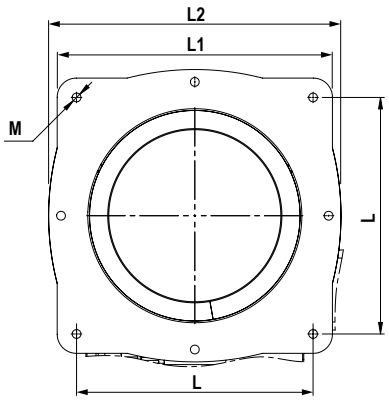


Connecting flange

Gas: TS 500.1 ... 12000.1
Oil and dual: TS 100 ... 1200.1



Gas: TS 1800.1 ... 34000.1
Oil and dual: TS 1800.1 ... 3400.1



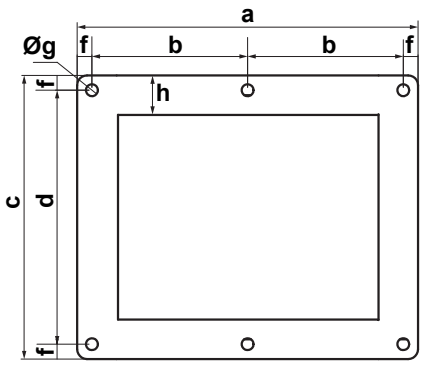
	A	B	C	D	D1	E	F	G	H	L	M	N
TS 1000.1 / TS 100	523	216	307	174	394	556	190	290	370	190	4xM10	139*
TS 1500.1 / TS 140	523	216	307	342	492	556	200	290	385	190	4xM10	139*
TS 2000.1 / TS 200.1	848	407	441	348	548	669	270	392	568	270	4X M16	125
TS 3000.1 / TS 300.1	986	472	514	330	530	763	290	392	575	270	4X M16	180
TS 4000.1 / TS 400.1	986	472	514	365	640	775	320	392	587	315	4X M16	188
TS 6000.1 / TS 600.1	998	478	520	373	698	838	325	405	614	330	4X M16	185
TS 8000.1 / TS 800.1	1251	633	618	470	770	1030	369	616	976	619	4X M20	195
TS 10000.1 / TS 1000.1	1178	603	575	470	770	1030	420	550	820	619	4X M20	195
TS 12000.1 / TS 1200.1	1178	603	575	470	770	1030	450	550	820	619	4X M20	195
TS 18000.1 / TS 1800.1	1330	620	710	590	710	1480	551	670	1063	619	4xM20	200
TS 23000.1 / TS 2300.1	1308	472	836	530	760	1549	720	760	1242	800	4xM20	210
TS 34000.1 / TS 3400.1	1308	472	836	530	760	1549	720	760	1242	800	4xM20	210

*: gas train connection on the right side of the burner
D: short head - D1: long head
Dimensions (in mm) make reference to the electronic versions; data may vary according to the configuration and options installed

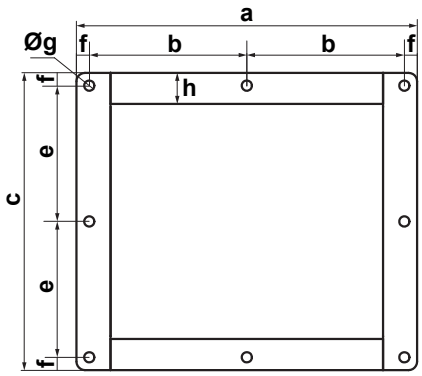
OVERALL DIMENSIONS - LOW NOx Class 3 models

Air duct

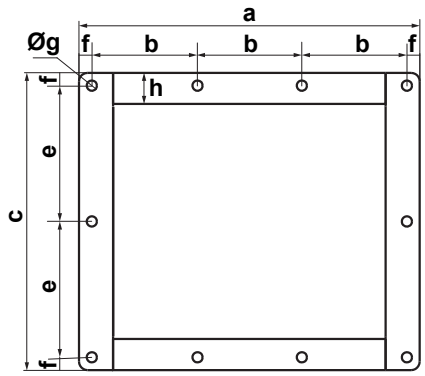
Gas: TS 500.1 ... 2000.1
Oil and dual: TS 100 ... 200.1



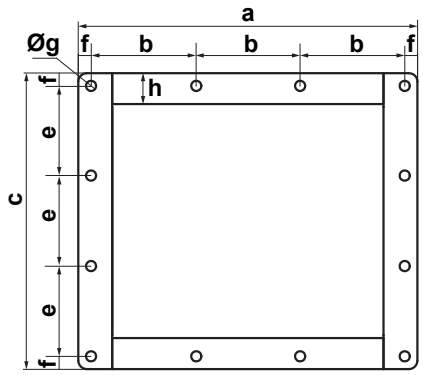
Gas: TS 3000.1 ... 6000.1
Oil and dual: TS 300 ... 600.1



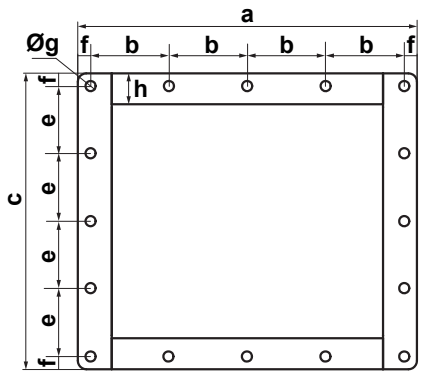
Gas: TS 8000.1 ... 12000.1
Oil and dual: TS 800.1 ... 1200.1



Gas: TS 18000.1
Oil and dual: TS 1800.1



Gas: TS 23000.1 ... 34000.1
Oil and dual: TS 2300.1 ... 3400.1



	a	b	c	d	e	f	Øg	h
TS 1000.1 / TS 100	303	136,5	252	222	-	15	6x R12	40
TS 1500.1 / TS 140	303	136,5	252	222	-	15	6x R12	40
TS 2000.1 / TS 200.1	345	157,5	287	257	-	15	6x R12	40
TS 3000.1 / TS 300.1	400	185	349	-	159,5	15	8x R12	40
TS 4000.1 / TS 400.1	400	185	349	-	159,5	15	8x R12	40
TS 6000.1 / TS 600.1	470	220	361	-	165,5	15	8x R12	40
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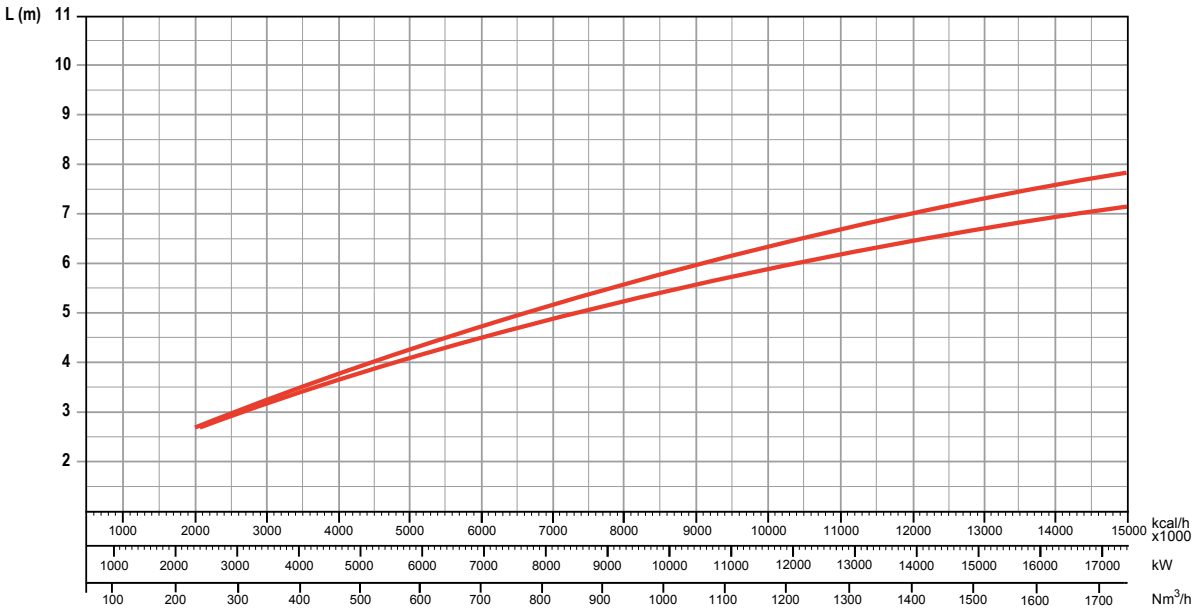
TS 12000.1 / TS 1200.1	557	173	474	-	218	19	10x R14	43
TS 18000.1 / TS 1800.1	730	230,7	650	-	204	19	12x R14	43
TS 23000.1 / TS 2300.1	930	223	828	-	197,5	19	16x R14	40
TS 34000.1 / TS 3400.1	930	223	828	-	197,5	19	16x R14	40

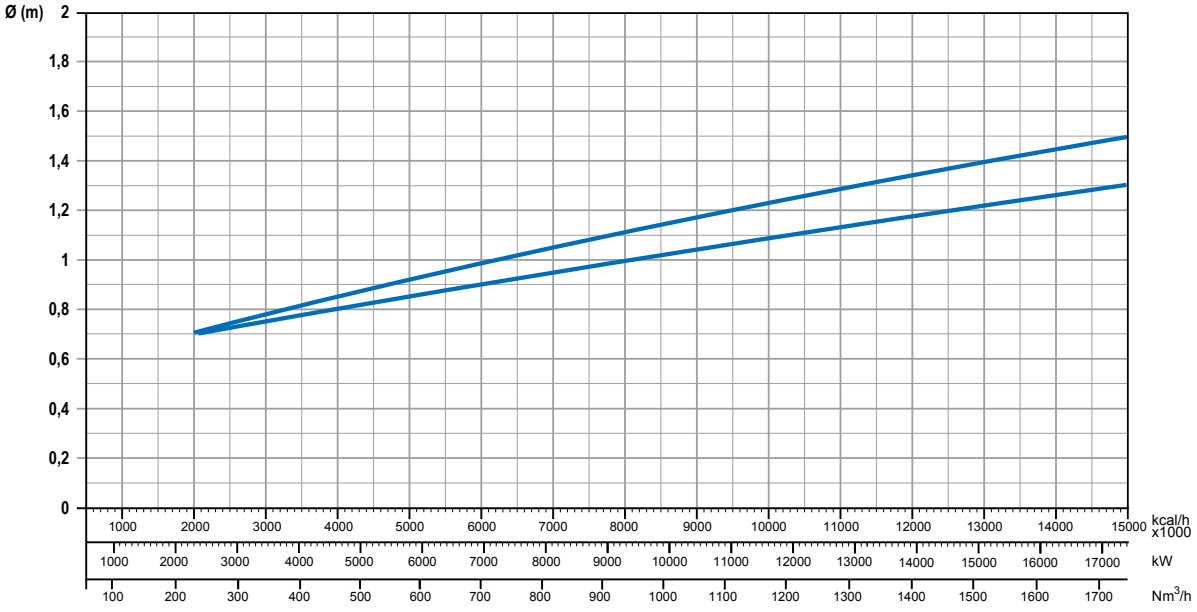
Dimensions in mm

FLAME DIMENSIONS

Flame lenght (gas burners)



Flame diameter (gas burners)



Data may vary depending on the configuration of the burner, the pressure of the combustion chamber and the draught.
The values in the graphs refer to tests carried out with flame tubes.

Example:
Burner output: 8000 kW
L flame (m) = 5 (medium value)
D flame (m) = 1 (medium value)

Modifications to the flame can be made in our Flexshop in order to shape the flame and meet specific requirements for special boilers or applications

TS RANGE

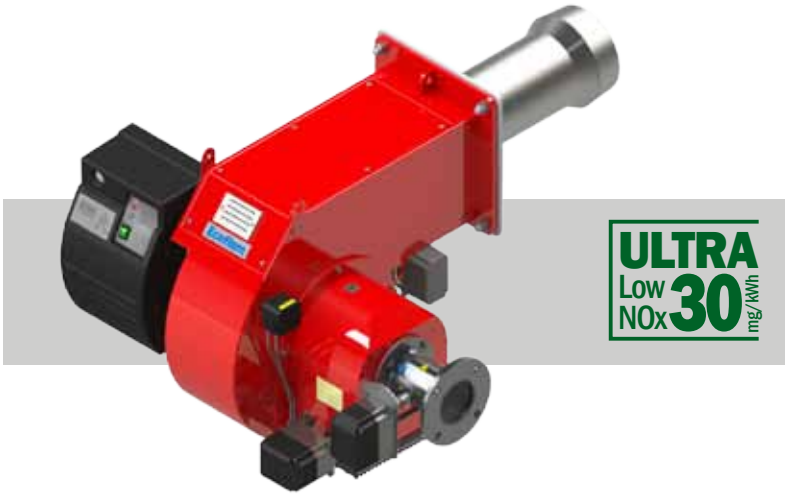
FGR SYSTEM (NOx ≤ 30 mg/kWh)

Ecoflam is renowned worldwide for providing high efficiency and reliable burners with significant energy savings and extreme ease of installation, maintenance and flexible boiler-burner matching.
Following a philosophy of continuous improving, the R&D Laboratory is constantly working to produce better results, such as the reduced NOx level emissions.
Decades of presence on the international market have enabled Ecoflam to develop a considerable experience in customizing burners and developing innovative technologies which are attentive to the issue of polluting emissions, even in the most demanding applications.
Ecoflam is therefore well placed to provide solutions for the growing number of markets which are enacting ever more restrictive emissions regulations.

In the laboratory of Resana, Italy, the R&D technicians are able to simulate real-life working conditions and measure the performance of burners fitted with Low NOx combustion heads and the **FGR system**.
The excellent results obtained in this field have enabled Ecoflam to offer a complete range of monoblock and duoblock products equipped with the FGR technology.

The principle of external flue gas recirculation consists in sending a mixture of comburent air and flue gas to the combustion head, thus reducing the NOx emissions.

This technology enables Ecoflam to guarantee emissions of less than **30 mg/kWh**, a value which is hard to obtain with conventional combustion systems, and offer cutting-edge products which satisfy the requirements of any current regulations.

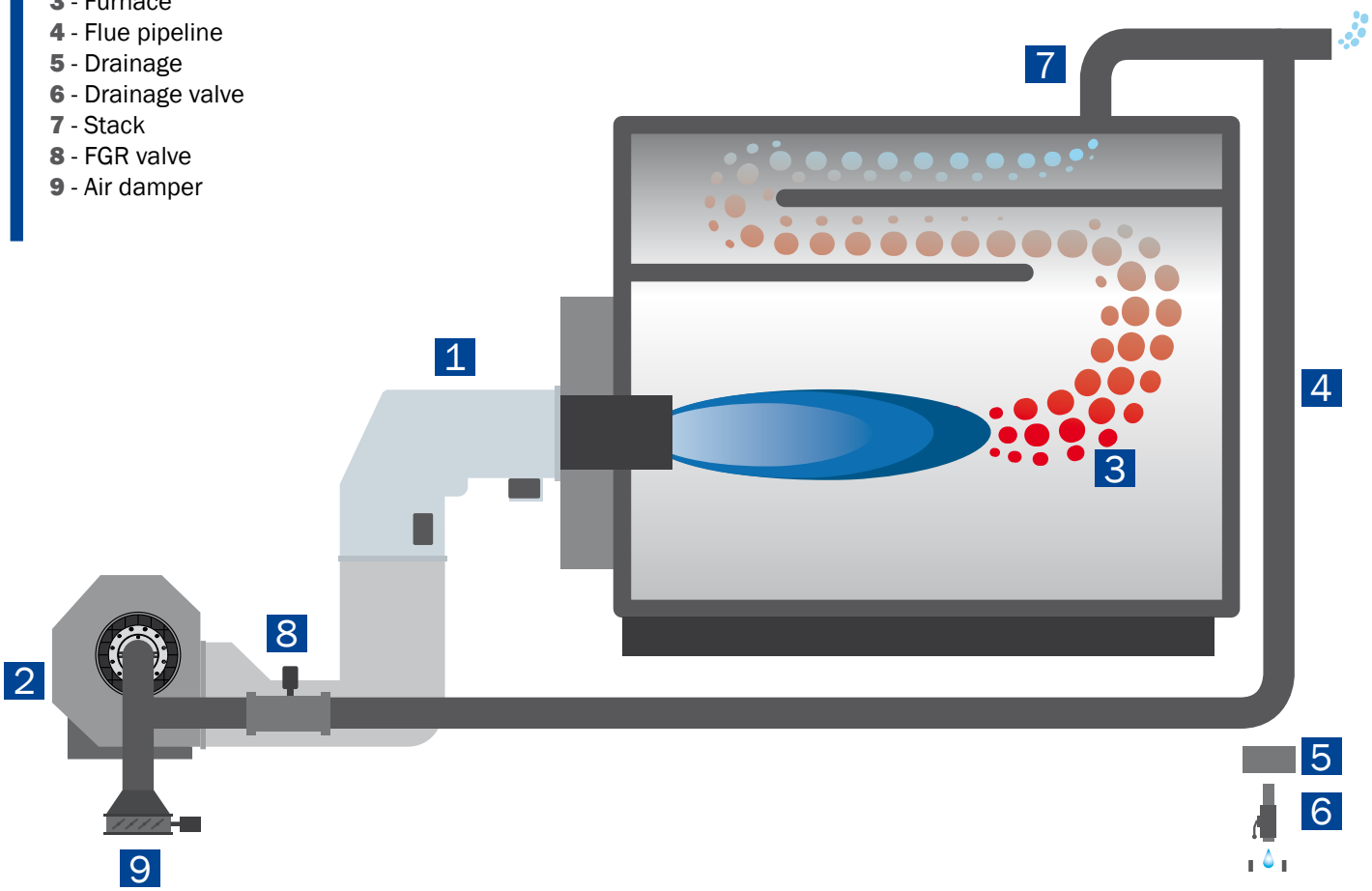


FGR SYSTEM (NOx ≤ 30 mg/kWh)

FGR ON DUOBLOCK BURNERS - LAYOUT 1

The FGR system for duoblock burners, in which the drughtfan is installed in a remote position, has a different layout, since the flue gas line must enter the circuit upstream of the fan itself. Furthermore, to generate the required suction to convey the flue gas into the fan and mix it with the comburent air, the flow regulation device must be located upstream of the flue gas inlet into the fan suction circuit. As for monoblock units, also here the flue gas line must be properly sized.

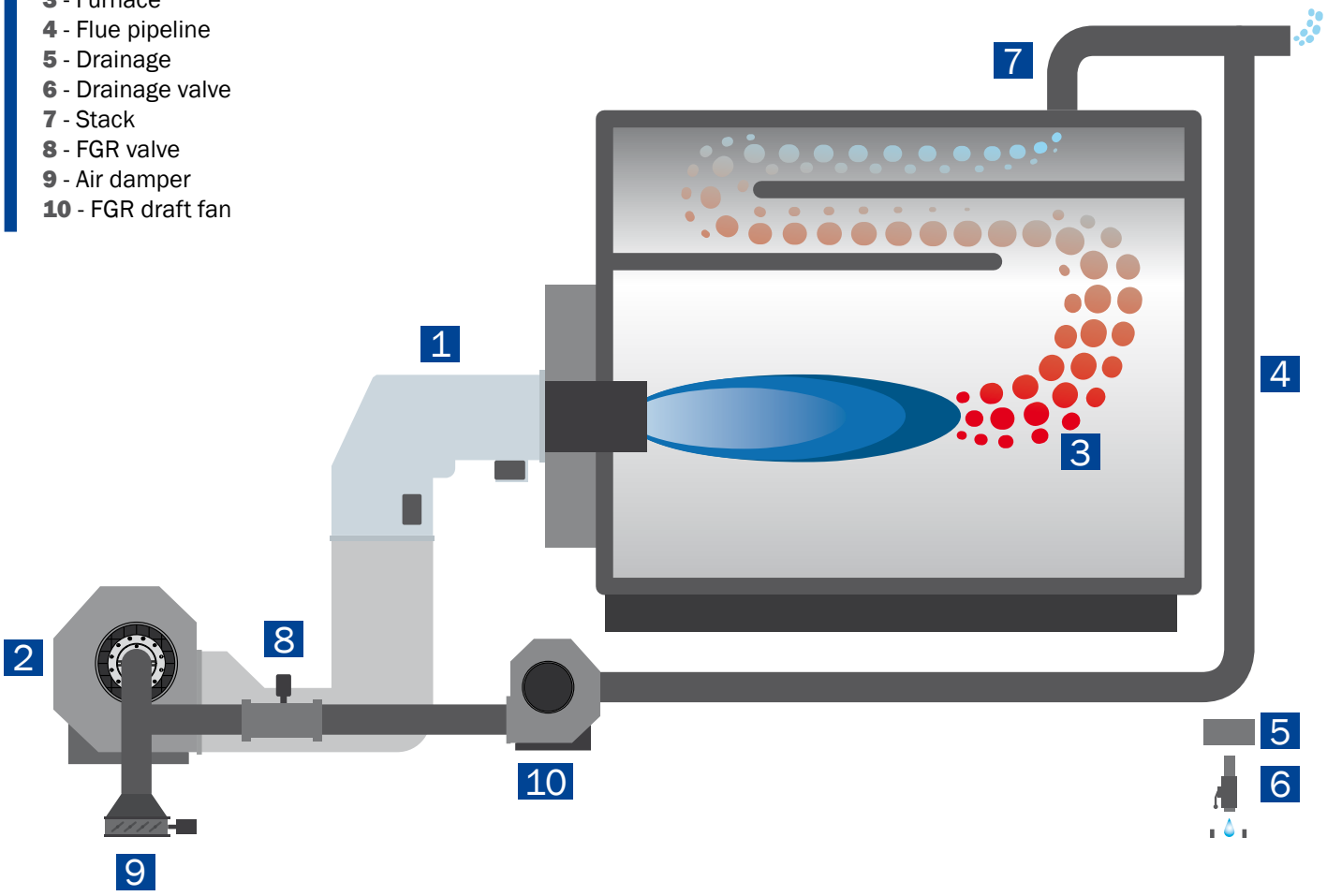
Legenda
1 - Burner
2 - Draught fan
3 - Furnace
4 - Flue pipeline
5 - Drainage
6 - Drainage valve
7 - Stack
8 - FGR valve
9 - Air damper



FGR ON DUOBLOCK BURNERS - LAYOUT 2

In case of installations with duoblock burners there is an alternative option to layout 1.
In this scenario there is a further draught fan dedicated to the flue: it takes the flue from the stack and pushes it into the duct between the burner and the fresh air draught fan.
The flue damper is just after the flue fan. The air damper is on burner board and therefore it adjusts the rate of the mixture between the flue and the fresh air.
Also in this case the flue duct has to be properly sized in order to minimize the pressure drop.

Legenda
1 - Burner
2 - Fresh air draught fan
3 - Furnace
4 - Flue pipeline
5 - Drainage
6 - Drainage valve
7 - Stack
8 - FGR valve
9 - Air damper
10 - FGR draft fan



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Email: export@ecoflam-burners.com

Company subject to the direction and coordination of Ariston Group.

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