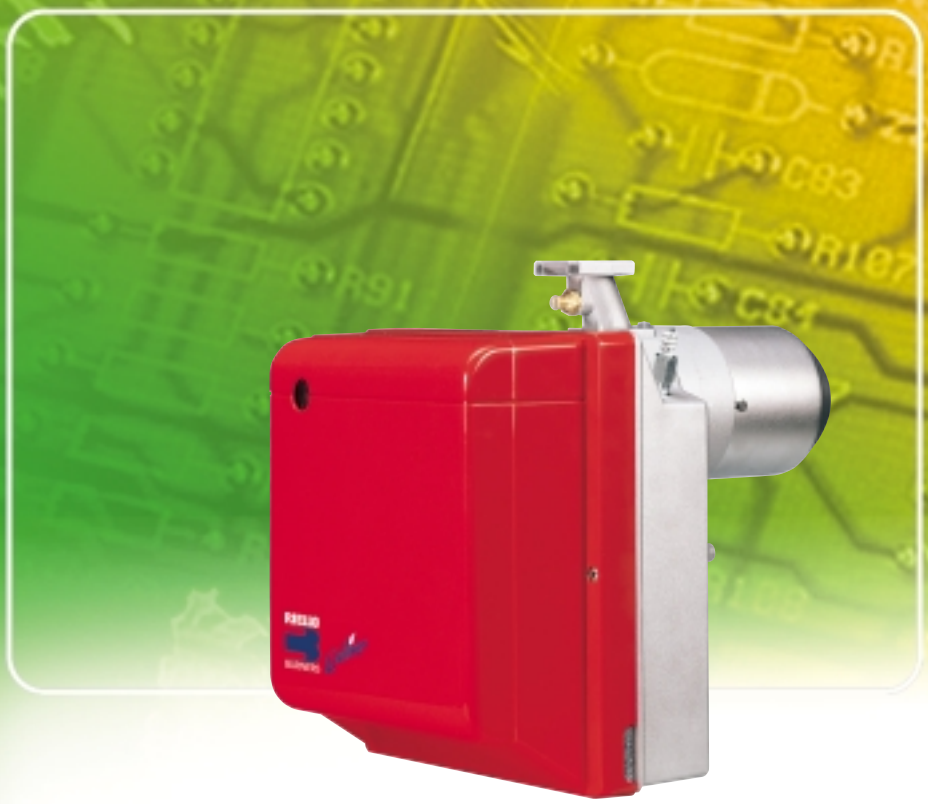
RIELLO BURNERS

CE

LOW NOx SINGLE-STAGE GAS BURNERS

GULLIVER BS SERIES

BS1	16	÷	52	kW
BS2	35	÷	91	kW
BS3	65	÷	189	kW
BS4	110	÷	246	kW



The Riello Gulliver BS series of single-stage gas burners, is a complete range of Low NOx emission products, developed to respond to any request for home heating, conforming to the most severe standards regarding the reduction of polluting emissions. This series of burners is available in four different models with an output ranging from 16 to 246 kW, divided in four different structures.
All the models use the same components designed by Riello for the Gulliver series. The high quality level guarantees safe working.
In developing these burners, special attention was paid to reducing noise, the ease of installation and adjustment, to obtaining the smallest size possible to fit into any sort of boiler available on the market.
All the models are approved by the EN 676 European Standard and LRV-92 Swiss standards, and conform to BImSchV 1996 and European Directives, Gas Appliance, EMC, Low Voltage, Boiler Efficiency.
All the Gulliver BS burners are tested before leaving the factory.

TECHNICAL DATA

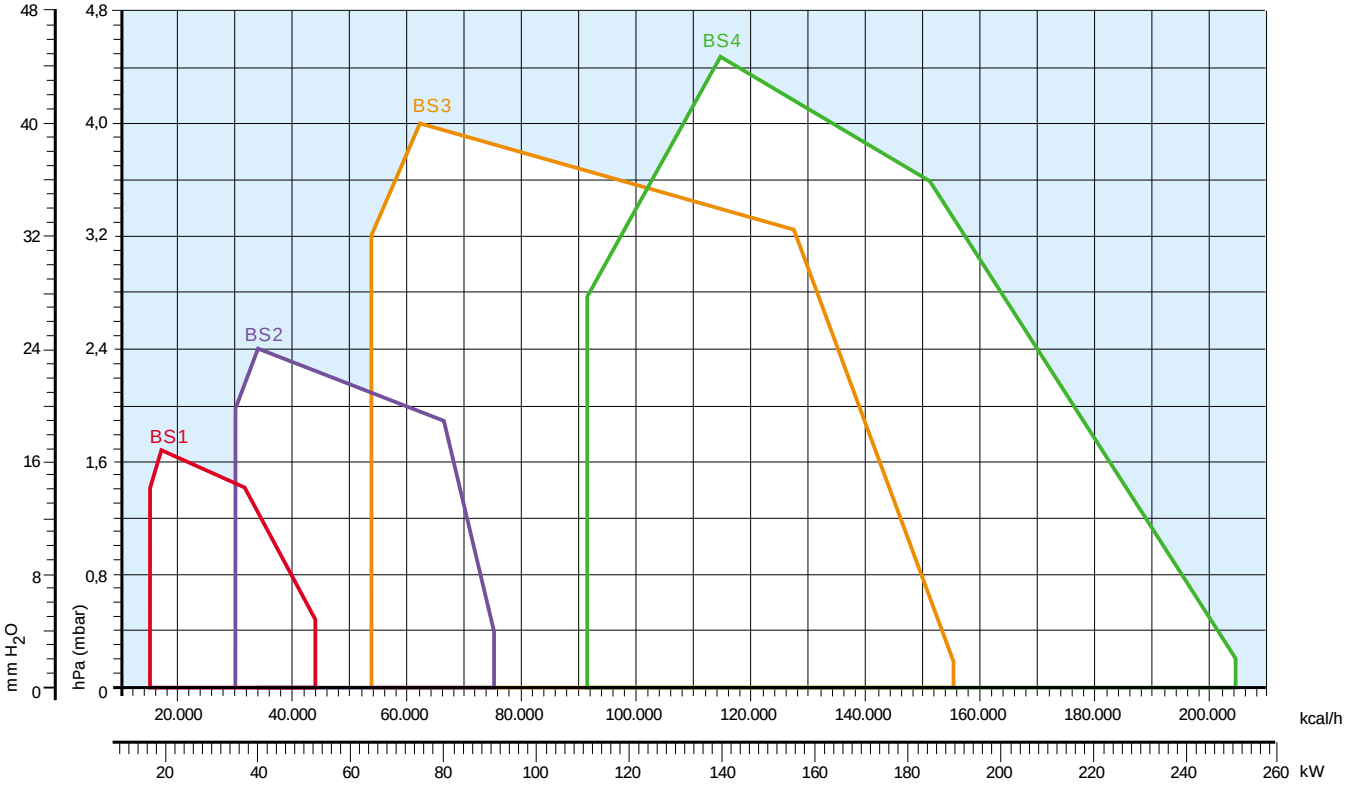
	Model		BS1	BS2	BS3	BS4
	Setting		Single-stage			
	Servo-motor type		--			
	Servo-motor run time		--			
	Heat output	kW	16 - 52	35 - 91	65 - 189	110 - 246
		Mcal/h	13,8 - 44,7	30,1 - 78,2	55,9 - 162,5	94,6 - 211,6
	Working temperature	°C min./max.	0/40			
Fuel / air data	Net calorific value G20 gas	kWh/Nm³	10			
	G20 gas density	kg/Nm³	0,71			
	G20 gas delivery	Nm³/h	1,6 - 5,2	3,5 - 9	6,5 - 19	11 - 24,6
	Net calorific value G25 gas	kWh/Nm³	8,6			
	G25 gas density	kg/Nm³	0,78			
	G25 gas delivery	Nm³/h	1,9 - 6	4 - 10,5	7,5 - 22	13 - 28,5
	Net calorific value LPG gas	kWh/Nm³	25,8			
	LPG gas density	kg/Nm³	2,02			
	LPG gas delivery	Nm³/h	0,6 - 2	1,3 - 3,5	2,5 - 7,3	4,2 - 9,5
	Fan	type	forward tilted blades			
	Air temperature	max. °C	40			
Electrical data	Electrical supply	Ph/Hz/V	1/50/230 ±10%			
	Aux. electrical supply	Ph/Hz/V	--			
	Control box	type	R.B.L. 568			
	Total electrical output	kW	0,15	0,18	0,35	0,43
	Protection level	IP	40			
	Electric motor output	kW	0,15	0,18	0,35	0,43
	Rated motor current	A	0,64	0,67	1,4	2
	Motor take-off current	A	3	3	3	8,5
	Motor protection level	IP	20			
	Ignition transformer		incorporated in the control box			
	Operation		intermittent (at least one halt every 24 h)			
Emissions	Sound pressure	dB(A)	61	62	66	71
	CO Emissions	mg/kWh	< 40			
	NOx Emissions	mg/kWh	< 80			
Approval	Directives		90/396/CEE, 89/336/CEE, 73/23/CEE, 92/42/CEE			
	Conforming to:		EN 676 - LRV 92 - BImSchV 1996			
	Certifications		CE - 0085 AQ0409			
			BUWAL - Nr.100010	BUWAL - Nr.197011	BUWAL - Nr.100010	BUWAL - Nr.100010

Reference conditions:
Temperature: 20°C
Pressure: 1013.5 Mbar
Altitude: 100 meters a.s.l.
Noise measured at a distance of 1 meter.

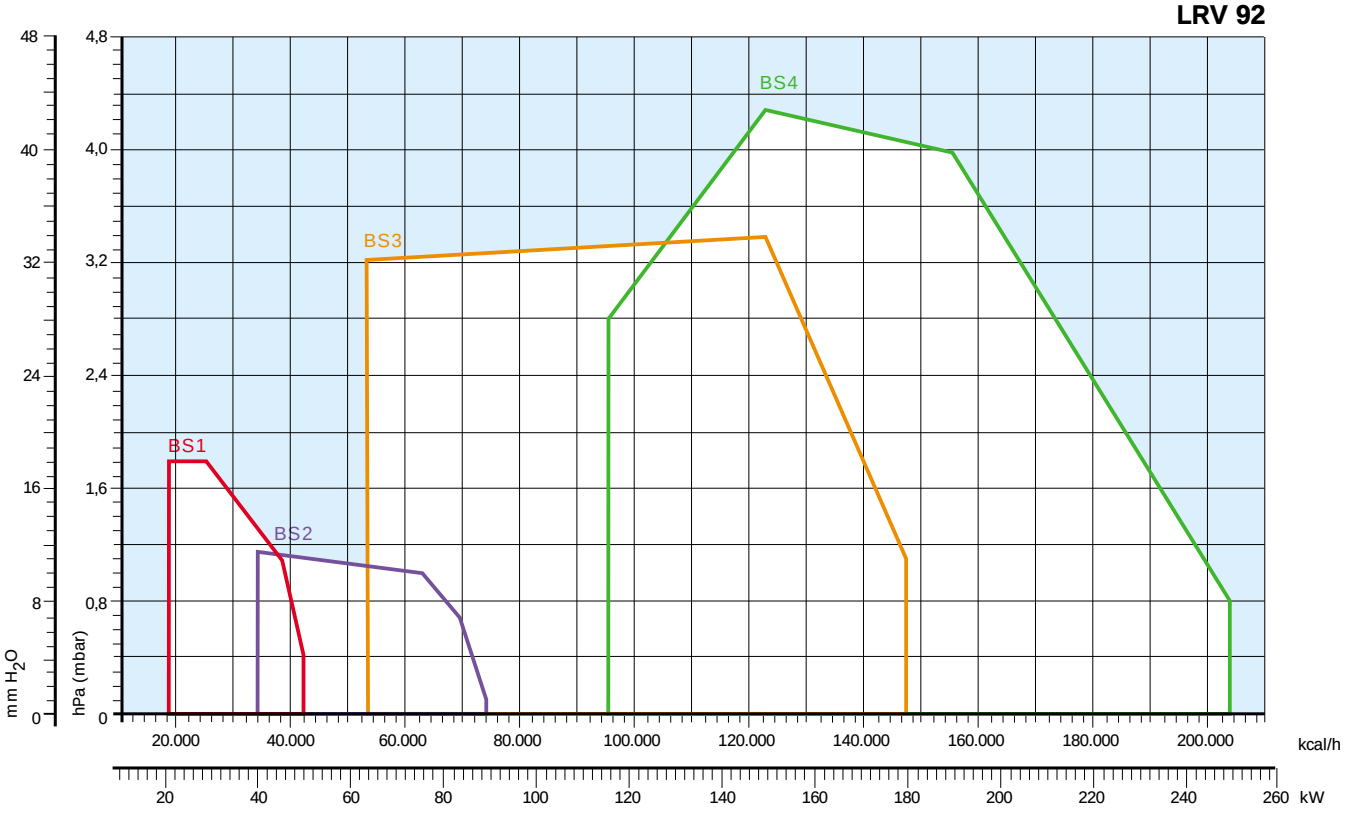
Since the Company is constantly engaged in the production improvement, the aesthetic and dimensional features, the technical data, the equipment and the accessories can be changed.
This document contains confidential and proprietary information of RIELLO S.p.A. Unless authorised, this information shall not be divulged, nor duplicated in whole or in part.

FIRING RATES

EN 676



LRV 92



Useful working field for choosing the burner

Test conditions conforming to EN 676 and LRV 92:
Temperature: 20 °C
Pressure: 1013.5 mbar
Altitude: 100 m a.s.l.

GAS TRAINS

The burners are set for fuel supply from either the right or left hand sides.

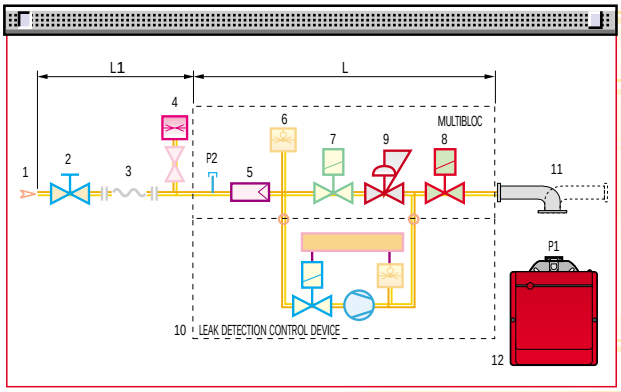
Depending on the fuel output and the available pressure in the supply line, you should check the correct gas train to be adapted to the system requirements.

The gas train is Multibloc type, containing the main components in a single unit.
Except for the MBDLE 055 model, a valve seal control (as accessory) can be fitted to the Multibloc gas trains.

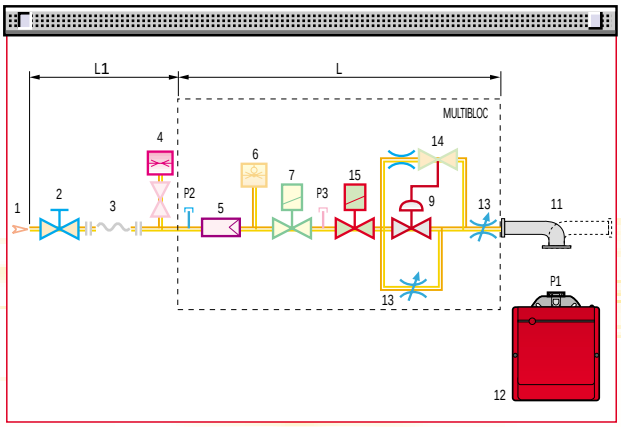
The MBDLE 055 Multibloc gas train can be fitted only to the left of the burner.

Gas train installed on the burner

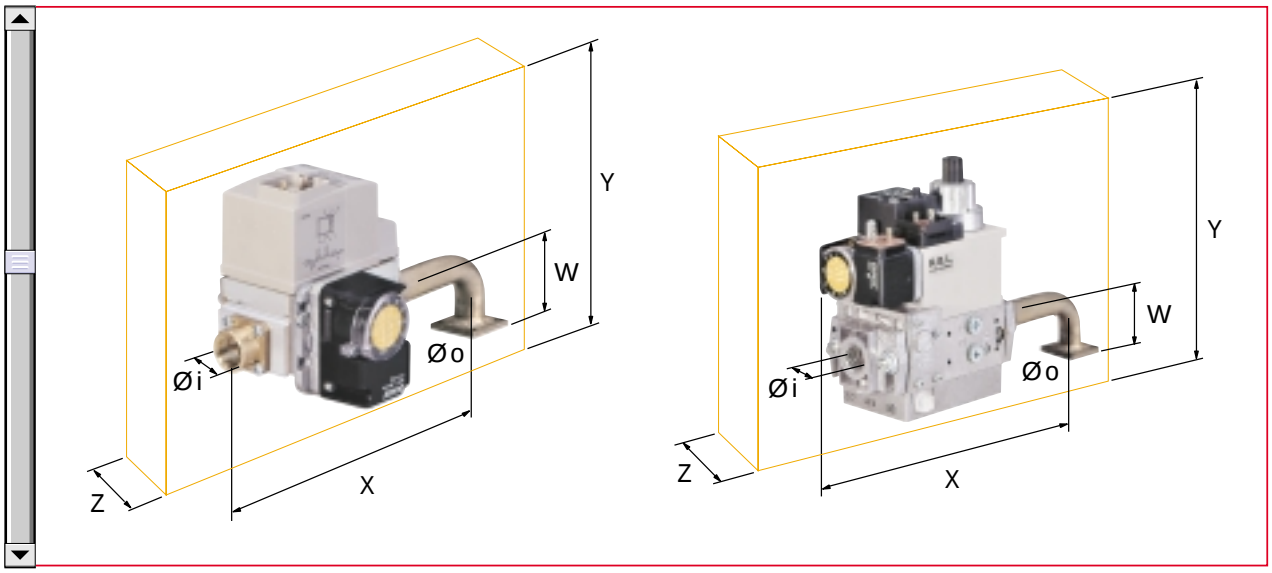
MBDLE 403 - 405 - 407 - 410 - 412



MBDLE 055



1	Gas delivery pipe
2	Manual valve
3	Vibration damping joint
4	Gas pressure gauge
5	Filter
6	Gas pressure switch
7	Safety solenoid
8	Adjustment solenoid: firing delivery adjustment (rapid opening) maximum delivery adjustment (slow opening)
9	Pressure regulator
10	Leak detection control device for valves 7 and 8 (accessory)
11	Gas train-burner adapter
12	Burner
13	Shutter with adjustment screws
14	Pressure regulator setting device
15	Regulation solenoid
P1	Combustion head pressure
P2	Upstream pressure from the filter
P3	Upstream pressure from the control valve
L	Gas train supplied separately
L1	To be performed by the installer



The dimensions of the gas trains vary depending on their construction features.
The following table shows the dimensions of the gas trains that can be fitted to Gulliver BS burners, intake diameter and the coupling flange to the burner.

MULTIBLOC

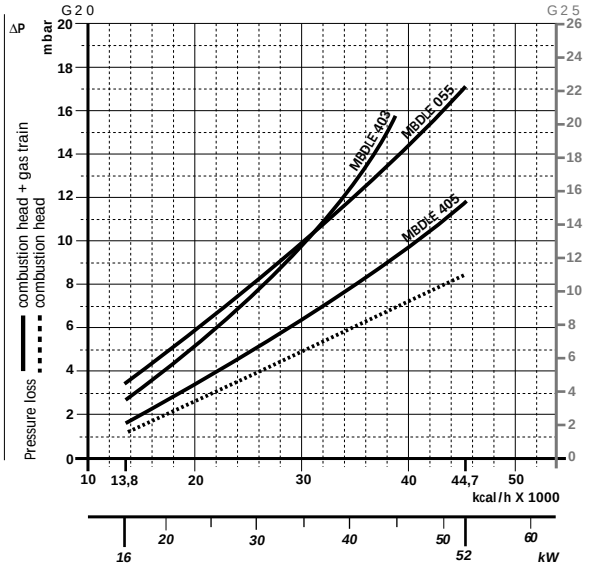
Name	Code	Ø i	Ø o	X mm	Y mm	W mm	Z mm
MBDLE 055	3970570	1/2"	FLANGE 1	232	126	45	122
MBDLE 403	3970545	1/2"	FLANGE 1	200	137	45	100
MBDLE 405	3970546	1/2"	FLANGE 1	246	186	45	120
MBDLE 405	3970547	3/4"	FLANGE 2	236	186	47	120
MBDLE 407	3970544	3/4"	FLANGE 2	236	186	47	120
MBDLE 407	3970548	3/4"	FLANGE 3	236	186	47	120
MBDLE 410	3970549	1" 1/4	FLANGE 3	259	215	47	145
MBDLE 412	3970550	1" 1/4	FLANGE 3	259	215	47	145

PRESSURE DROP DIAGRAMS

The diagrams indicate the minimum pressure drop of the burners with the various gas trains that can be combined with them; the value thus calculated represents the minimum required input pressure to the gas train.

NATURAL GAS

BS1

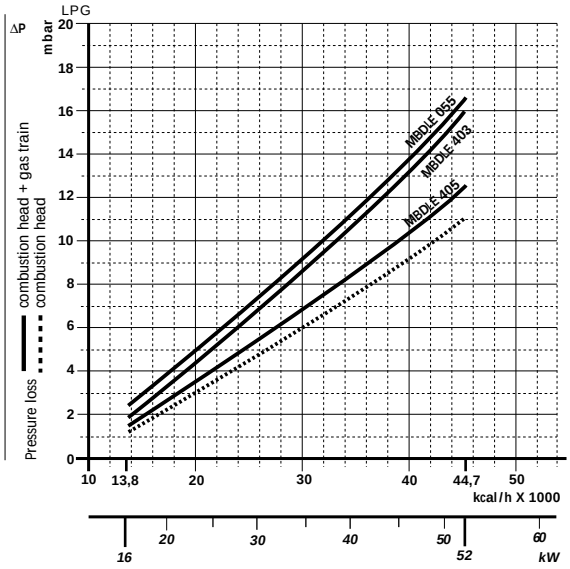


Gas Train	Code	Output
MBDLE 403	3970545	≤ 45 kW *
MBDLE 405	3970546	-
MBDLE 055	3970570	-

* with natural gas.

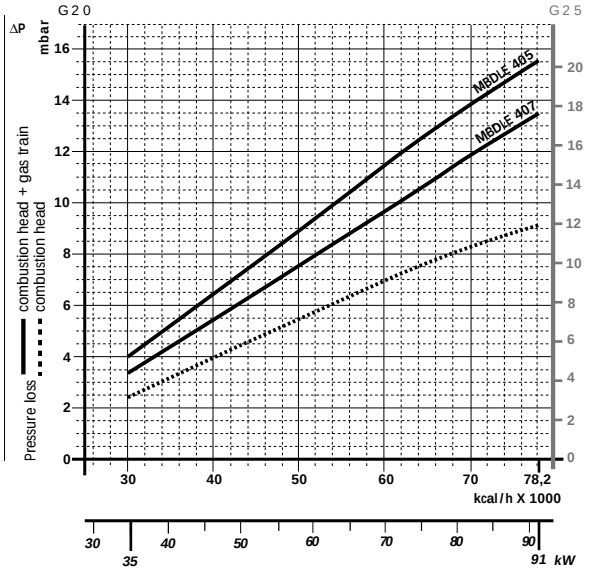
LPG

BS1



NATURAL GAS

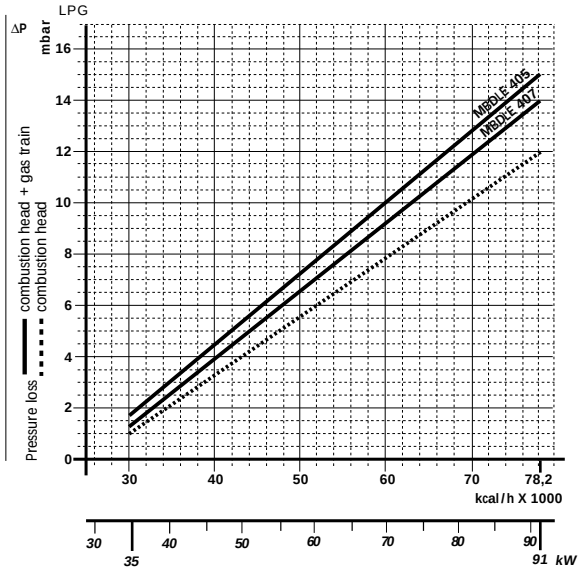
BS2



Gas Train	Code
MBDLE 405	3970547
MBDLE 407	3970544

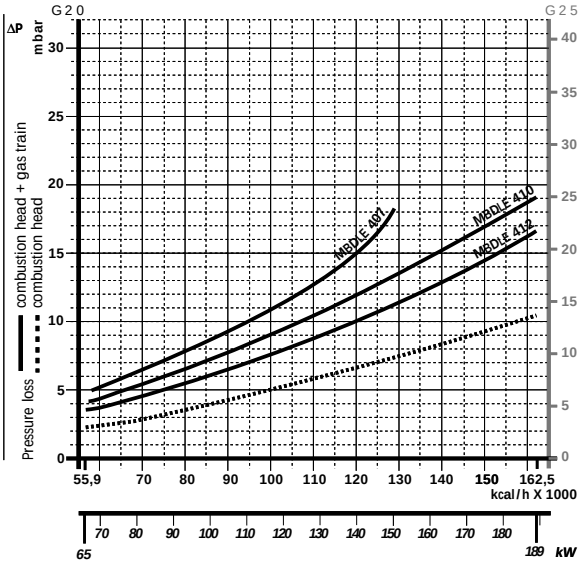
LPG

BS2



NATURAL GAS

BS3

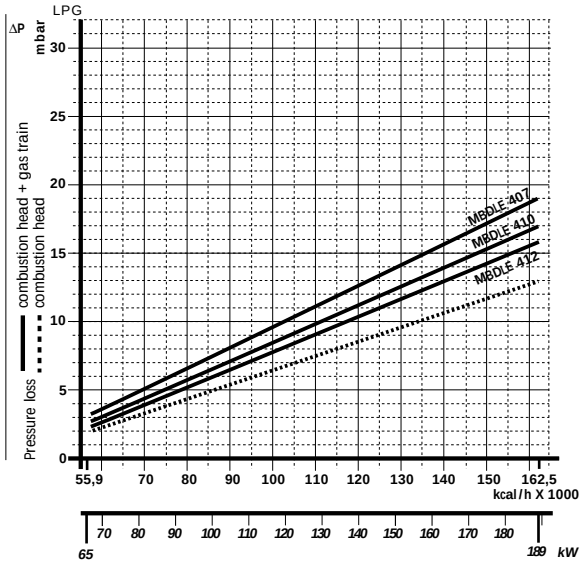


Gas Train	Code	Output
MBDLE 407	3970548	≤ 150 kW *
MBDLE 410	3970549	-
MBDLE 412	3970550	-

* with natural gas.

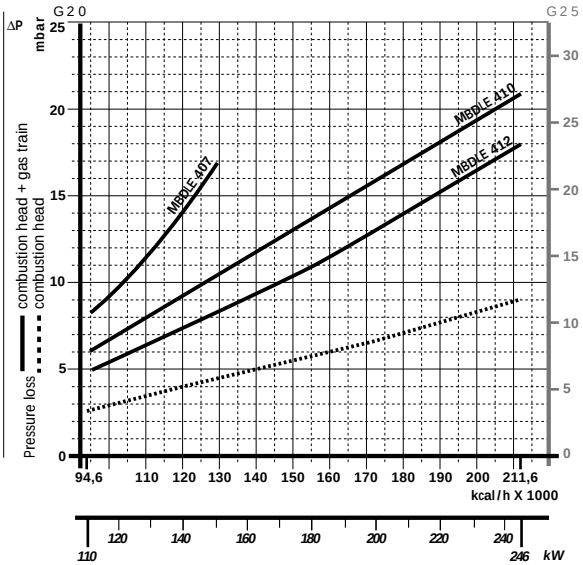
LPG

BS3



NATURAL GAS

BS4

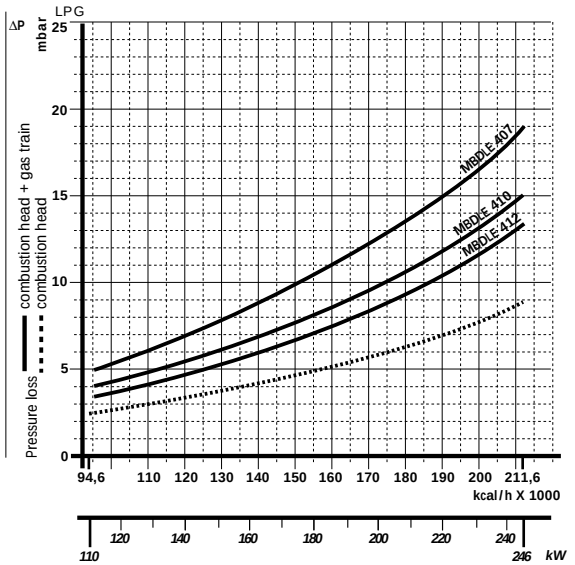


Gas Train	Code	Output
MBDLE 407	3970548	≤ 150 kW *
MBDLE 410	3970549	-
MBDLE 412	3970550	-

* with natural gas.

LPG

BS4



note *For pressure levels different from those indicated above, please contact Riello Burners Technical Office.*

DIMENSIONING OF THE FUEL SUPPLY LINES

The following diagram enables pressure drop in a pre-existing gas line to be calculated and to select the correct gas train.
The diagram can also be used to select a new gas line when fuel output and pipe length are known. The pipe diameter is selected on the basis of the desired pressure drop. The diagram uses methane gas as reference; if another gas is used, conversion coefficient and a simple formula (on the diagram) transform the gas output to a methane equivalent (refer to figure A). Please note that the gas train dimensions must take into account the back pressure of the combustion chamber during operations.

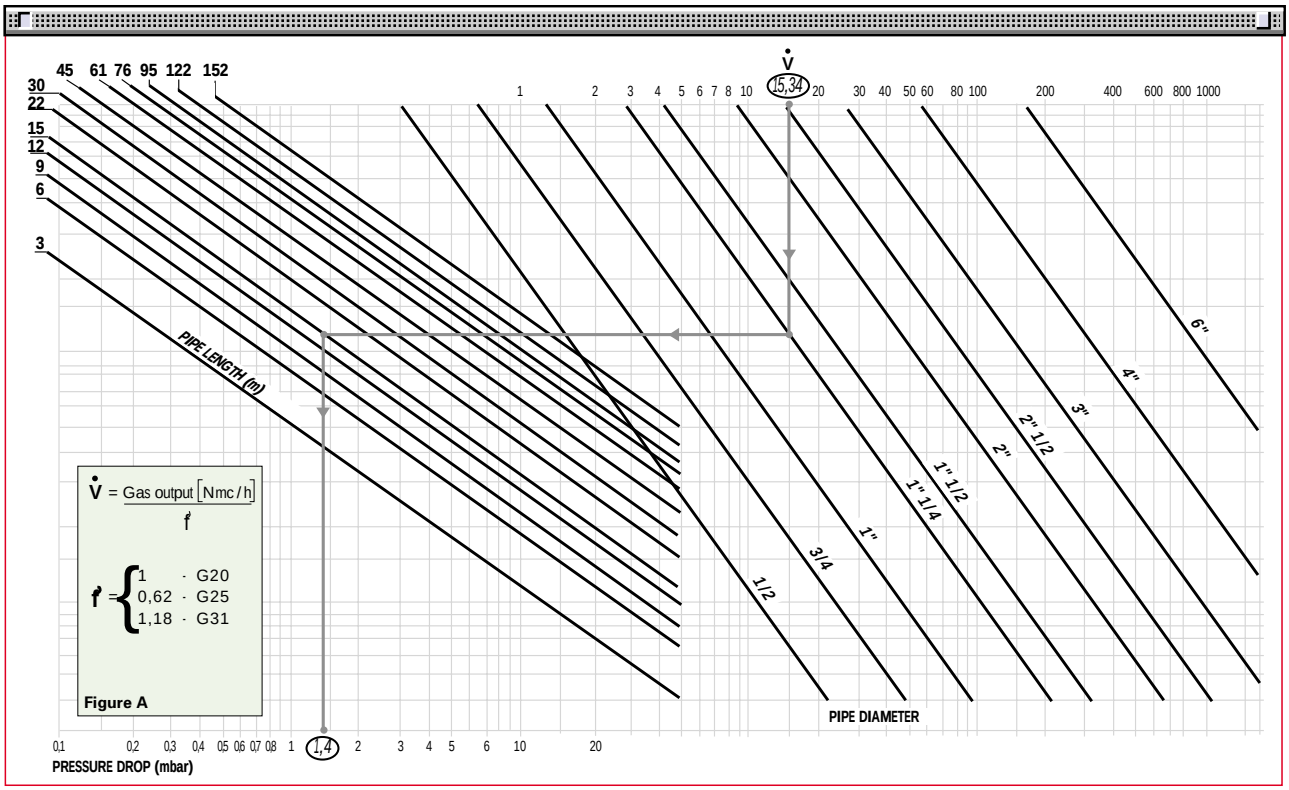
Control of the pressure drop in an existing gas line or selecting a new gas supply line. The methane output equivalent is determined by the formula fig. A on the diagram and the conversion coefficient.

Once the equivalent output has been determined on the delivery scale ($\dot{V}$), shown at the top of the diagram, move vertically downwards until you cross the line that represents the pipe diameter; at this point, move horizontally to the left until you meet the line that represents the pipe length. Once this point is established you can verify, by moving vertically downwards, the pipe pressure drop on the botton scale (mbar).
By subtracting this value from the pressure measured on the gas meter, the correct pressure value will be found for the choice of gas train.

Example:
- gas used G25
- gas output 9.51 mc/h
- pressure at the gas meter 20 mbar
- gas line length 15 m
- conversion coefficient 0.62 (see figure A)

- equivalent methane output $\dot{V} = \left[\frac{9.51}{0.62}\right] = 15.34$ mc/h
- once the value of 15.34 has been identified on the output scale ($\dot{V}$), moving vertically downwards you cross the line that represents 1" 1/4 (the chosen diameter for the piping);
- from this point, move horizontally to the left until you meet the line that represents the length of 15 m of the piping;
- move vertically downwards to determine a value of 1.4 mbar in the pressure drop botton scale;
- subtract the determined pressure drop from the meter pressure, the correct pressure level will be found for the choice of gas train;

- correct pressure = (20-1.4) = 18.6 mbar

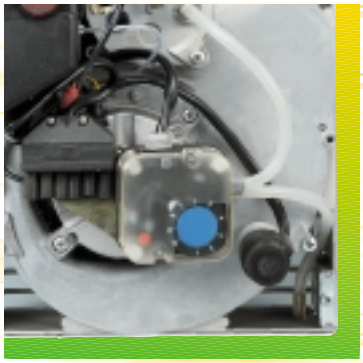


VENTILATION

The different ventilation circuits always ensure low noise levels with high performance of pressure and air delivery, inspite of their compact size.

Air suction

The burners are fitted with an adjustable air pressure switch, conforming to EN 676 standards.



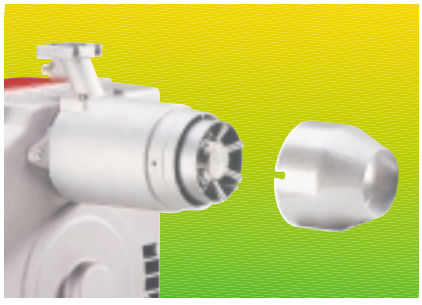
Air pressure switch

COMBUSTION HEAD

The combustion head in Gulliver BS burners is the result of an innovative design, which allows combustion with low polluting emissions, while being easy to adapt to all the various types of boilers and combustion chambers.

Thanks to the use of a mobile coupling flange, the penetration of the head into the combustion chamber can be adjusted.

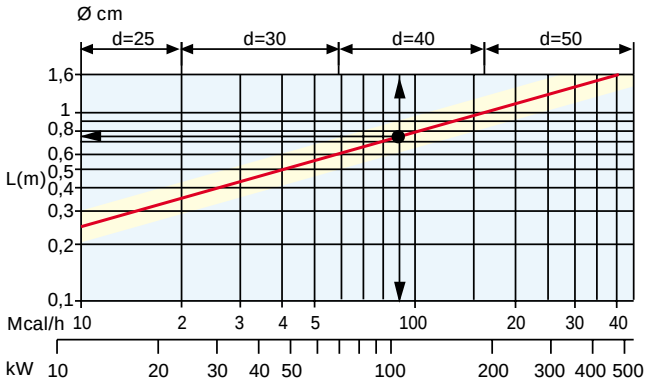
Simple adjustment allows the internal geometry of the combustion head to be adapted to the burner output.

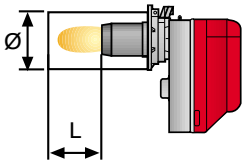


Combustion head

Mobile flange

Combustion chamber dimensions used in the test laboratory





$$L\ (m) = 0{,}23 \times \sqrt{\frac{kW}{10}}$$

With simple adjustments, the burner can be adapted to combustion chambers that are slightly different from those used in the tests.

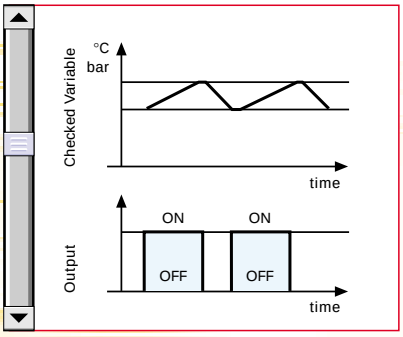
Example:
burnt thermal delivery = 105 kW;
L (m) = 0,23 x $\sqrt{10{,}5}$ = 0,74 (m);
Ø = 40 (cm)

ADJUSTMENT

BURNER OPERATION MODE

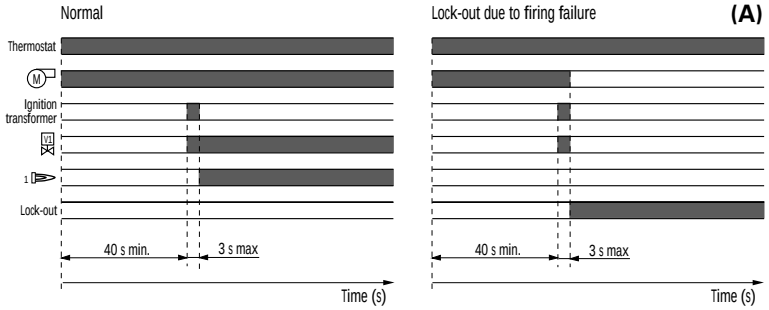
All these models are single-stage working.

Single-stage" operation



Air damper adjustment

FIRING



(A) Lock-out is shown by a led on the appliance.

Correct operations

0s	The burner begins the firing cycle
0s-40s	Pre-purge with the air damper open
40s	Ignition.

Lock-out due to firing failure

If the flame does not light within the safety limit (~ 3s) the burner locks-out.