RIELLO BURNERS

CE

# LOW NOx TWO STAGE GAS BURNERS

## GULLIVER BSD SERIES

| | |
|---|---|
| **BS1D** | 16/19 ÷ 52 kW |
| **BS2D** | 35/40 ÷ 91 kW |
| **BS3D** | 65/75 ÷ 189 kW |
| **BS4D** | 110/140 ÷ 246 kW |

The Riello Gulliver BSD series of two 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. The Gulliver BSD burners are fitted with a microprocessor - based flame control panel, with diagnostic functions.
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.
Two stage working guarantees high level performance from the thermal unit.
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 BSD burners are tested before leaving the factory.

# TECHNICAL DATA

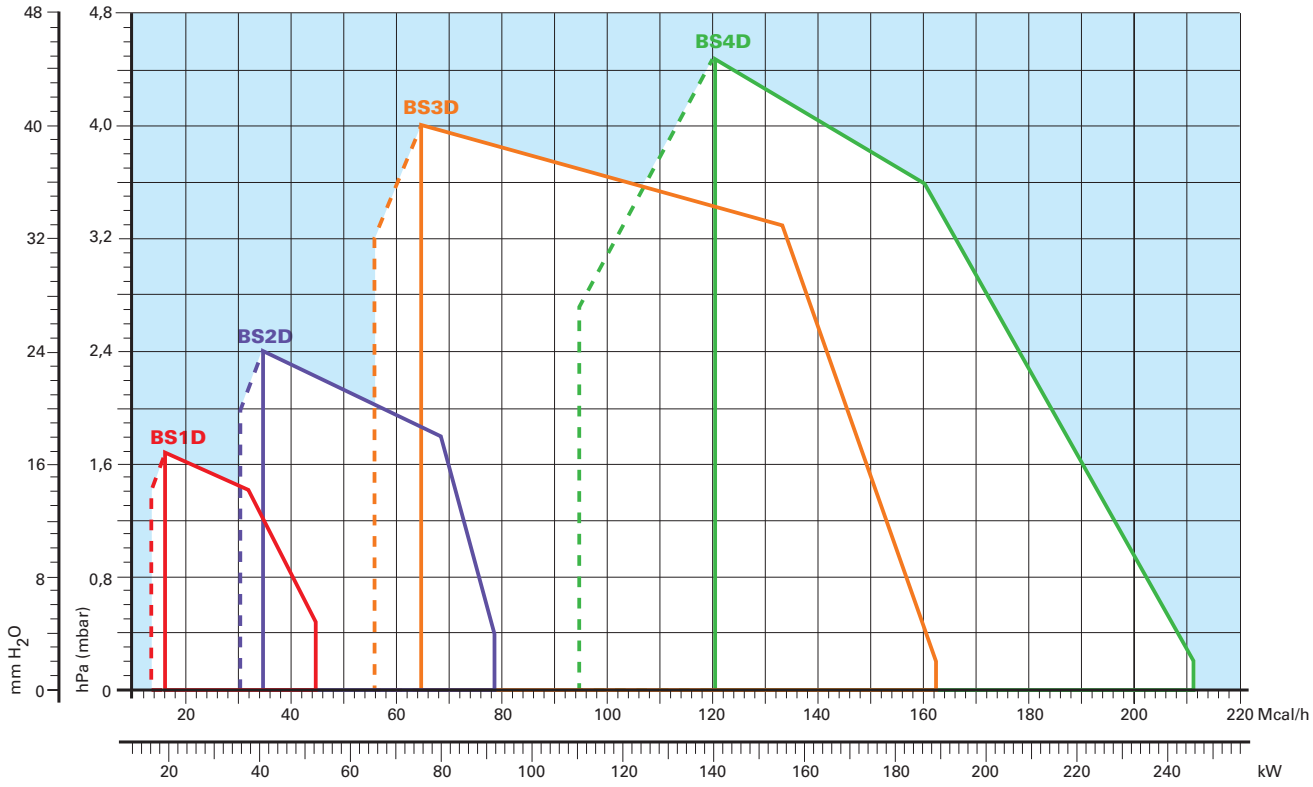
| | Model | | | BS1D | BS2D | BS3D | BS4D |
|---|---|---|---|---|---|---|---|
| | Burner operation mode | | | Two stage | | | |
| | Modulation ratio at max. output | | | -- | | | |
| | Servomotor | | type | R.B.L. | | | |
| | | run time | s | 5 ÷ 25 | | | |
| | Heat output | | kW | 16/19 - 52 | 35/40 - 91 | 65/75 - 189 | 110/140 - 246 |
| | | | Mcal/h | 13,8/16,3 - 44,7 | 30,1/34,4 - 78,2 | 55,9/64,5 - 162,5 | 94,6/120,4 - 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 | 1,6/1,9 - 5,2 | 3,5/4 - 9,1 | 6,5/7,5 - 18,9 | 11/14 - 24,6 |
| | Net calorific value G25 gas | | kWh/Nm³ | 8,6 | | | |
| | G25 gas density | | kg/Nm³ | 0,78 | | | |
| | G25 gas delivery | | Nm³/h | 1,9/2,2 - 6 | 4/4,7 - 10,6 | 7,6/8,7 - 22 | 12,8/16,3 - 28,6 |
| | Net calorific value LPG gas | | kWh/Nm³ | 25,8 | | | |
| | LPG gas density | | kg/Nm³ | 2,02 | | | |
| | LPG gas delivery | | Nm³/h | 0,6/0,7 - 2 | 1,3/1,6 - 3,5 | 2,5/2,9 - 7,3 | 4,3/5,4 - 9,5 |
| | Fan | | type | Centrifugal with forward curve blades | | | |
| | Air temperature | | max °C | 40 | | | |
| Electrical data | Electrical supply | | Ph/Hz/V | 1/50/230 ±10% | | | |
| | Auxiliary electrical supply | | Ph/Hz/V | -- | | | |
| | Control box | | type | MG 569 | | | |
| | Total electrical power | | kW | 0,150 | 0,180 | 0,350 | 0,530 |
| | Auxiliary electrical power | | kW | -- | | | |
| | Protection level | | IP | X0D | | | |
| | Motor electrical power | | kW | 0,09 | 0,09 | 0,15 | 0,25 |
| | Rated motor current | | A | 0,64 | 0,67 | 1,4 | 2 |
| | Motor start up current | | A | 2,6 | 2,7 | 5,6 | 8 |
| | Motor protection level | | IP | 20 | | | |
| | Ignition transformer | | type | Incorporated in the control box | | | |
| | | | V1 - V2 | ( - ) - 8 kV | | | |
| | | | I1 - I2 | ( - ) - 12 mA | | | |
| | Operation | | | Intermittent (at least one stop every 24 h) | | | |
| Emissions | Sound pressure | | dB (A) | 61 | 62 | 66 | 71 |
| | Sound power | | W | -- | | | |
| | CO emission | | mg/kWh | < 40 | | | |
| | NOx emission | | mg/kWh | < 80 | | | |
| Approval | Directive | | | 90/396/EEC, 89/336/EEC, 73/23/EEC, 98/37/EEC, 92/42/EEC | | | |
| | Conforming to | | | EN 676 - LRV 92 - BImSchV 1996 | | | |
| | Certification | | | CE - 0085 AQ0409<br>BUWAL - Nr.100010 | | | |

**Reference conditions:**
Temperature: 20°C
Pressure: 1013,5 mbar
Altitude: 100 m a.s.l.
Noise measured at a distance of 1 meter.

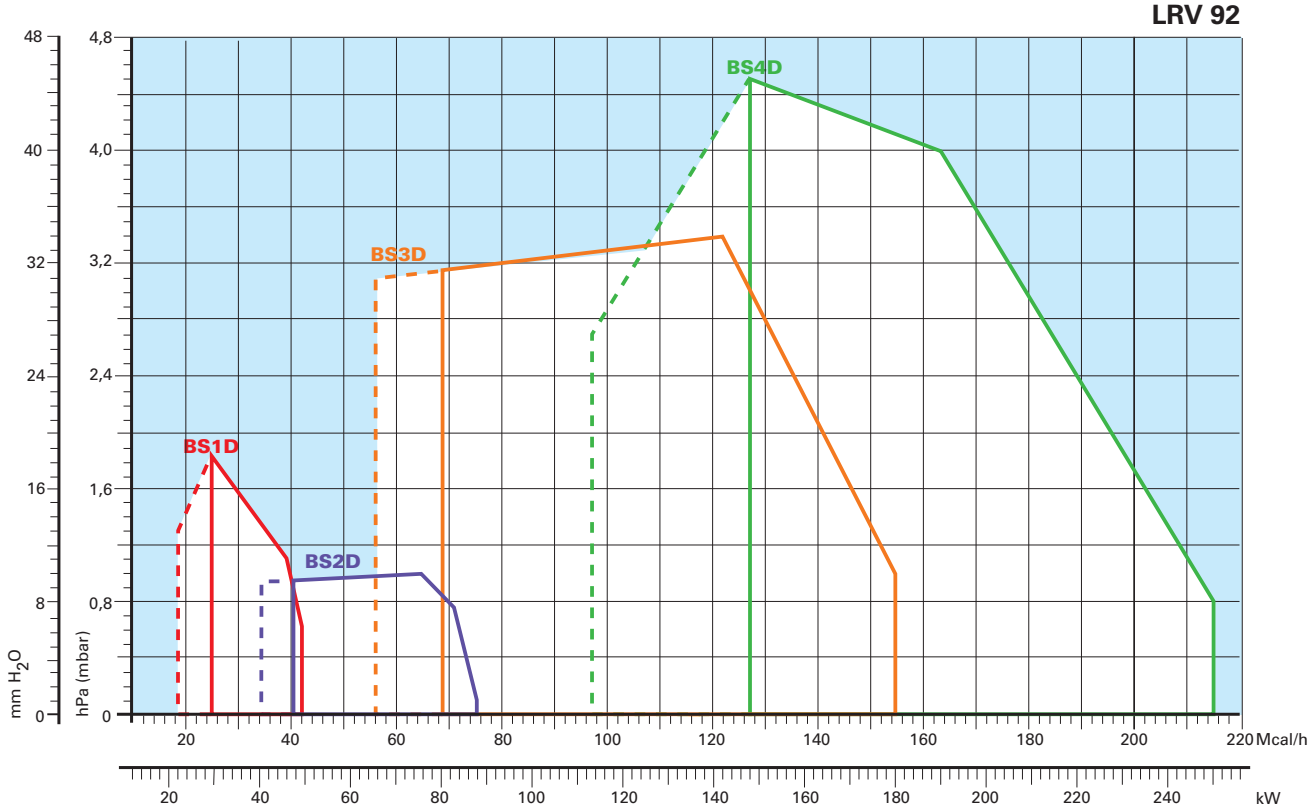
*Since the Company is constantly engaged in the production improvement, the aesthetic and dimensional features, the technical data, the equipment and the accessories can be changed.*

# FIRING RATES

## EN 676




## LRV 92




Useful working field for choosing the burner

1st stage operation range

**Test conditions conforming to EN 676 and LRV 92:**
Temperature: 20 °C
Pressure: 1013,5 mbar
Altitude: 100 m a.s.l.

# FUEL SUPPLY

## GAS TRAIN

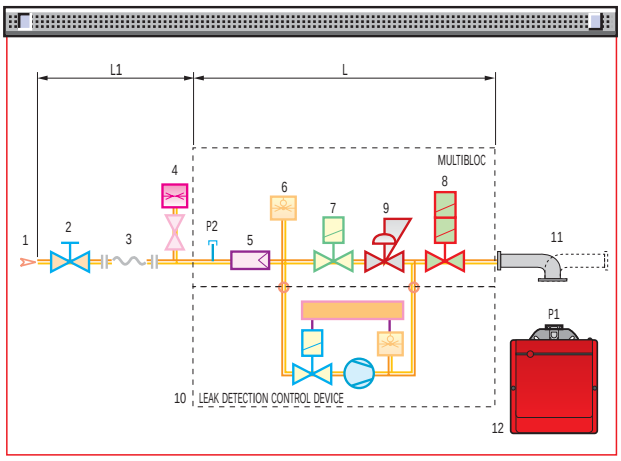
The burners are set for fuel supply from either the right or left hand sides.

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.

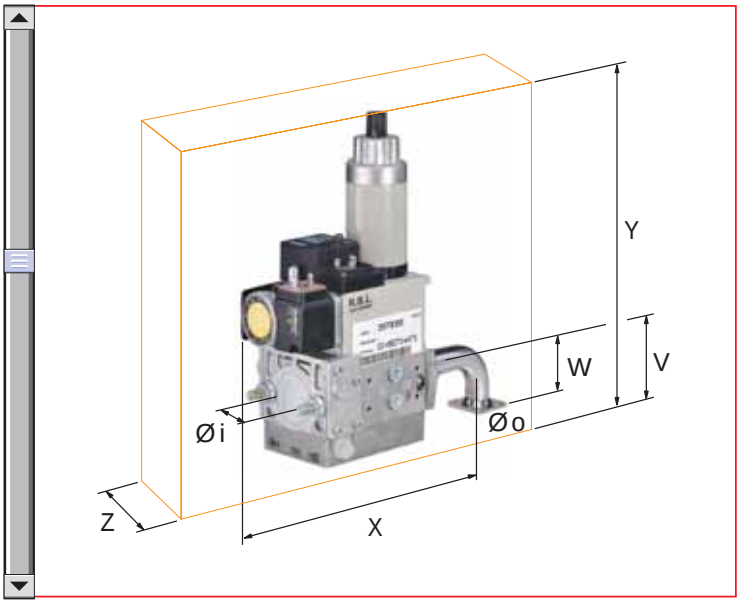
The gas train is Multibloc type, containing the main components in a single unit and it can be fitted with the valve seal control (as an accessory).

*Gas train installed on the burner*

### MBZRDLE 405 - 407 - 410 - 412




| | |
|---|---|
| 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 1st and 2nd stage:<br>firing delivery adjustment (rapid opening)<br>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 |
| P1 | Combustion head pressure |
| P2 | Upstream pressure from the filter |
| 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 BSD 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 | V mm | mbar max* |
|---|---|---|---|---|---|---|---|---|---|
| **MBZRDLE 405** | 3970539 | 1/2" | FLANGE 1 | 246 | 257 | 45 | 120 | 46 | 300 |
| **MBZRDLE 405** | 3970540 | 3/4" | FLANGE 2 | 236 | 257 | 47 | 120 | 46 | 300 |
| **MBZRDLE 407** | 3970538 | 3/4" | FLANGE 2 | 236 | 257 | 47 | 120 | 46 | 300 |
| **MBZRDLE 407** | 3970541 | 3/4" | FLANGE 3 | 236 | 257 | 47 | 120 | 46 | 300 |
| **MBZRDLE 410** | 3970542 | 1" 1/4 | FLANGE 3 | 259 | 315 | 47 | 145 | 55 | 300 |
| **MBZRDLE 412** | 3970543 | 1" 1/4 | FLANGE 3 | 259 | 315 | 47 | 145 | 55 | 300 |

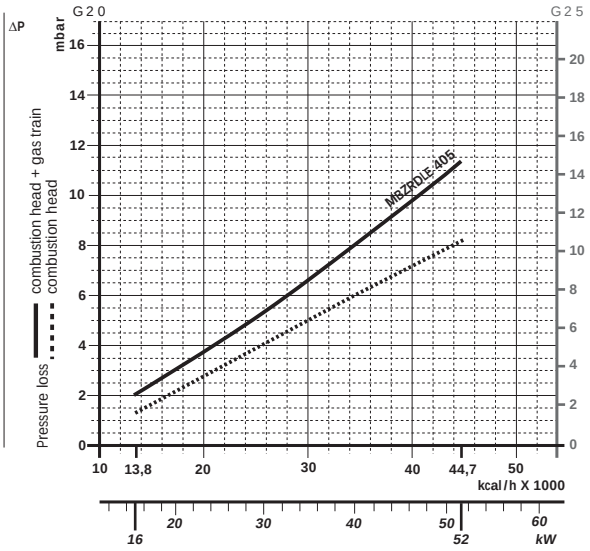
* max inlet gas pressure (mbar)

## PRESSURE DROP DIAGRAM

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

***NATURAL GAS***

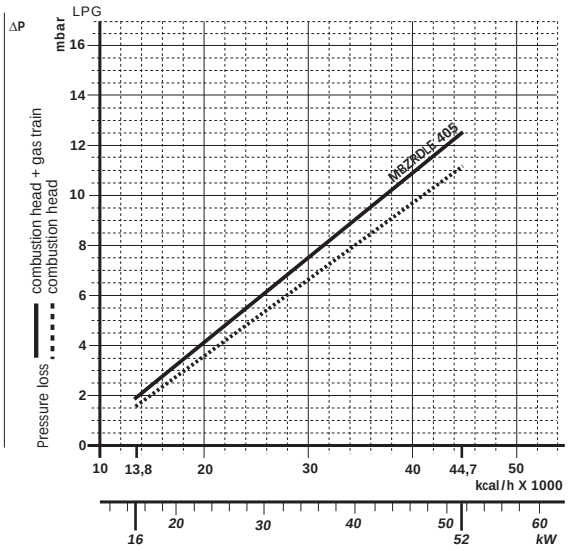
**BS1D**



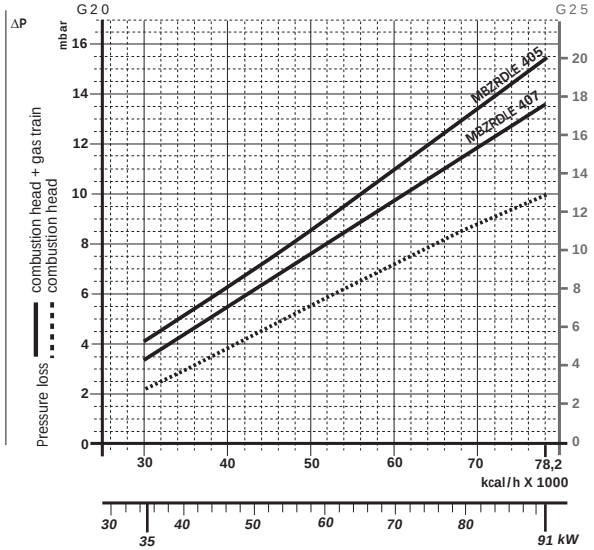

| Gas Train | Code | Plug and socket |
|---|---|---|
| **MBZRDLE 405** | 3970539 | • |

***LPG***

**BS1D**

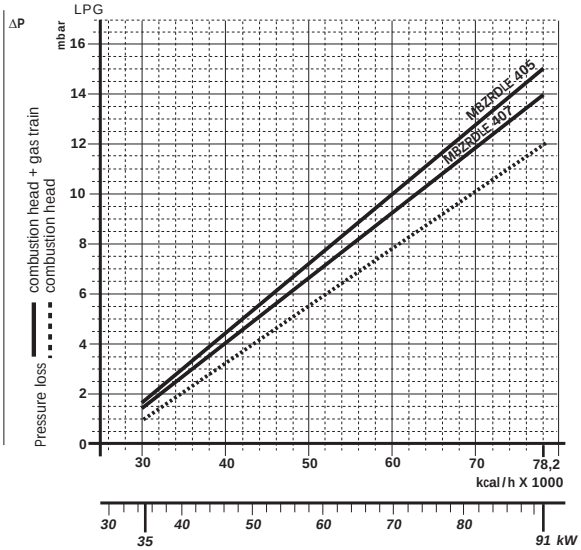



**BS2D**



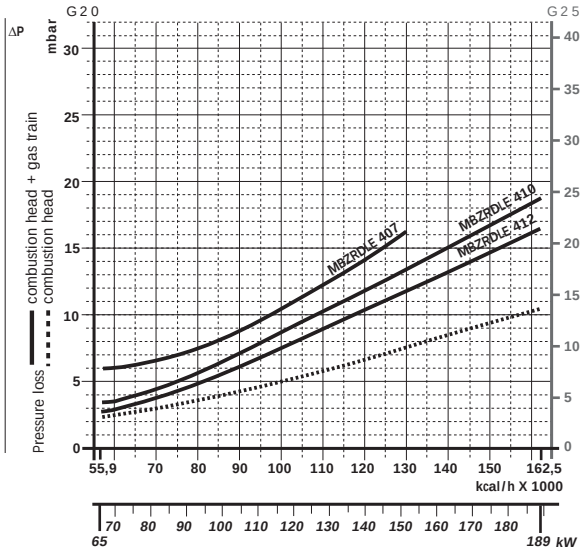

| Gas Train | Code | Plug and socket |
|---|---|---|
| **MBZRDLE 405** | 3970540 | • |
| **MBZRDLE 407** | 3970538 | • |

**BS2D**



## *NATURAL GAS*

### BS3D

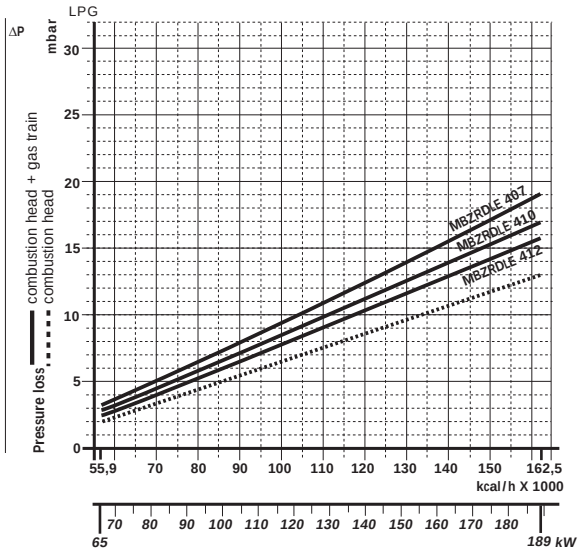



| Gas Train | Code | Output | Plug and socket |
|---|---|---|---|
| **MBZRDLE 407** | 3970541 | ≤ 150 kW * | • |
| **MBZRDLE 410** | 3970542 | - | • |
| **MBZRDLE 412** | 3970543 | - | • |

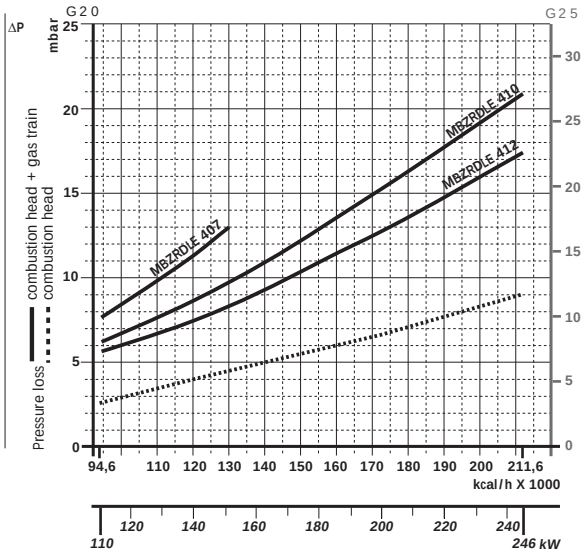
* with natural gas.

## *LPG*

### BS3D



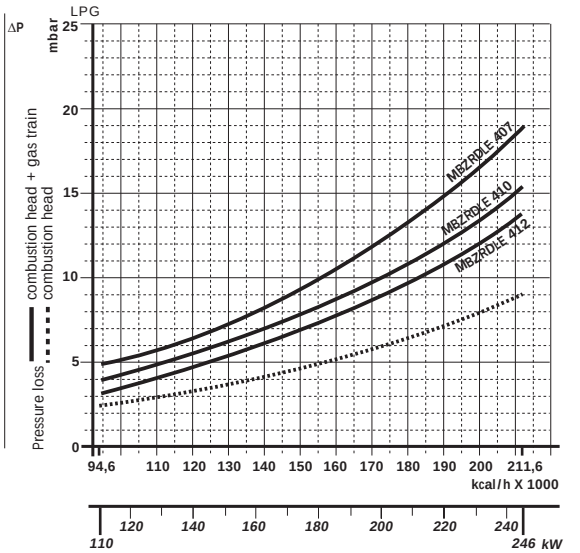

### BS4D




| Gas Train | Code | Output | Plug and socket |
|---|---|---|---|
| **MBZRDLE 407** | 3970541 | ≤ 150 kW * | • |
| **MBZRDLE 410** | 3970542 | - | • |
| **MBZRDLE 412** | 3970543 | - | • |

* with natural gas.

### BS4D




**note** *For pressure levels different from those indicated above, please contact Riello Burners Technical Office.*
*In LPG plants, Multibloc gas trains do not operate below 0°C.*
*They are only suitable for gaseous LPG (liquid hydrocarbons destroy the seal materials).*

# 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*

*Air pressure switch*

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

# COMBUSTION HEAD

The combustion head in Gulliver BSD 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.

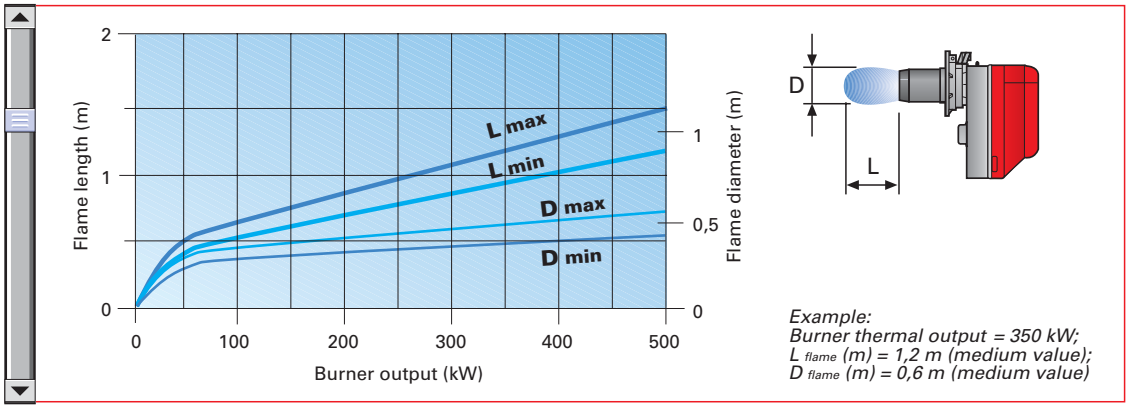
*Combustion head*

*Mobile flange*

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.

**Dimensions of the flame**

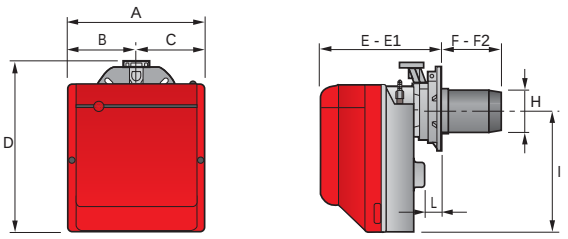



*Example:*
*Burner thermal output = 350 kW;*
*L flame (m) = 1,2 m (medium value);*
*D flame (m) = 0,6 m (medium value)*

# OVERALL DIMENSIONS (mm)

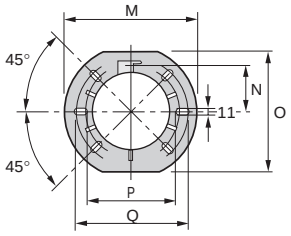
These models are distinguished by their reduced size, in relation to their output, which means they can be fitted to any boiler on the market.

## BURNER



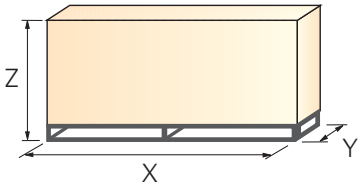

| Model | A | B | C | D | E | E1 | F | F2 | H | I | L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BS1D | 234 | 122 | 112 | 295 | 230 | 276 | 116 | 70 | 89 | 210 | 41 |
| BS2D | 255 | 125,5 | 125,5 | 325 | 238 | 252 | 114 | 100 | 106 | 230 | 45 |
| BS3D | 300 | 150 | 150 | 391 | 262 | 280 | 128 | 110 | 129 | 285 | 45 |
| BS4D | 300 | 150 | 150 | 392 | 278 | 301 | 168 | 145 | 137 | 286 | 45 |

## BURNER-BOILER MOUNTING FLANGE




| Model | M | N | O | P | Q |
|---|---|---|---|---|---|
| BS1D | 192 | 66 | 167 | 140 | 170 |
| BS2D | 192 | 66 | 167 | 140 | 170 |
| BS3D | 216 | 76,5 | 201 | 160 | 190 |
| BS4D | 218 | 80,5 | 203 | 170 | 200 |

## PACKAGING




| Model | X | Y | Z | kg |
|---|---|---|---|---|
| BS1D | 385 | 268 | 340 | 11 |
| BS2D | 395 | 288 | 365 | 12 |
| BS3D | 440 | 335 | 430 | 16 |
| BS4D | 500 | 335 | 430 | 18 |

RIELLO BURNERS

CE

# TWO STAGE GAS BURNER

**GULLIVER RSD SERIES** ▸ **RS5D** 160/208 ÷ 345 kW

The Riello Gulliver RS5D is a new model of the series of two stage gas burners, characterized for its small dimensions in spite of its high combustion performance. It has been developed to respond to any request for home heating, conforming to current regulations in force. This model uses the same components designed by Riello for the Gulliver series. The high quality level guarantees safe working. The Gulliver RSD burners are fitted with a microprocessor - based flame control panel, with diagnostic functions.
In developing this burner, 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.
This model is approved by the EN 676 European Standard and European Directives, Gas Appliance, EMC, Low Voltage, Boiler Efficiency.
The Gulliver RS5D burner is tested before leaving the factory.

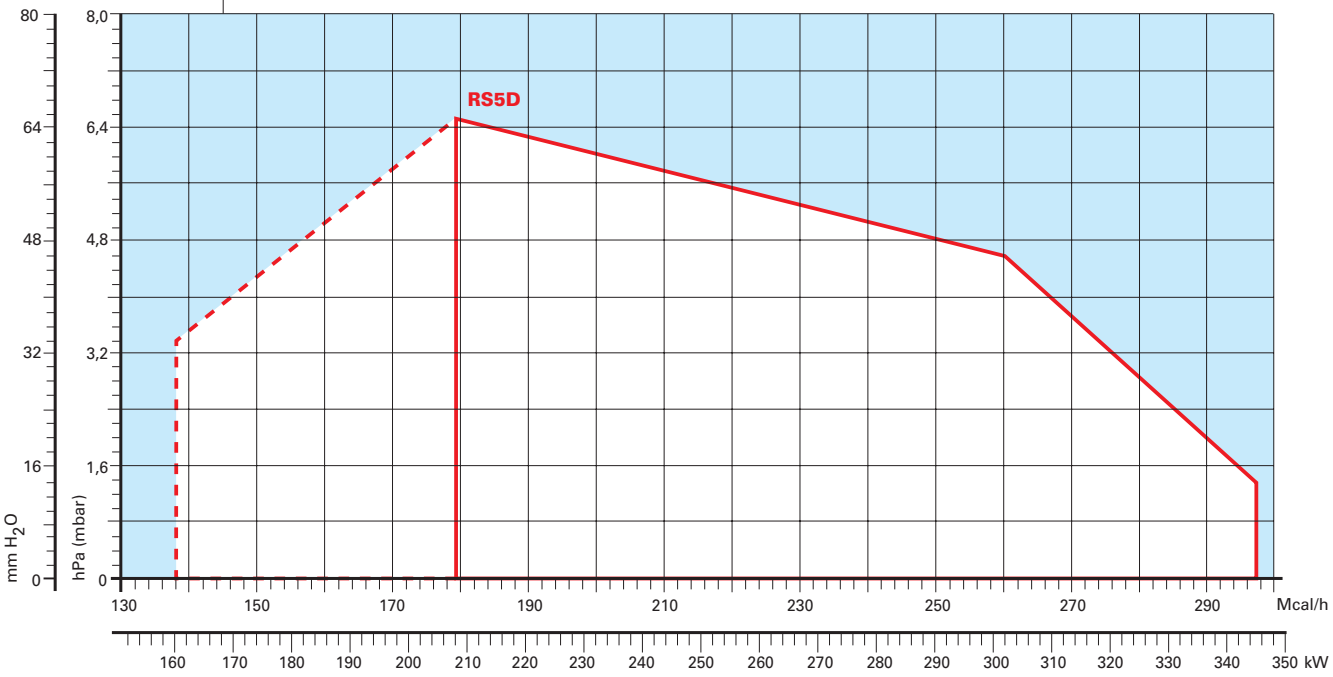
# TECHNICAL DATA

| | | | |
|---|---|---|---|
| | Model | | RS5D |
| | | | |
| | Burner operation mode | | Two stage |
| | Modulation ratio at max. output | | -- |
| | Servomotor | type | BERGER |
| | Servomotor run time | s | 3 ÷ 8 |
| | Heat output | kW | 160/208 - 345 |
| | Heat output | Mcal/h | 137,6/178,8 - 296,7 |
| | Working temperature | °C min./max. | 0/40 |
| Fuel / air data | Net calorific value G20 gas | kWh/Nm³ | 10 |
| Fuel / air data | G20 gas density | kg/Nm³ | 0,71 |
| Fuel / air data | G20 gas delivery | Nm³/h | 16/20,8 - 34,5 |
| Fuel / air data | Net calorific value G25 gas | kWh/Nm³ | 8,6 |
| Fuel / air data | G25 gas density | kg/Nm³ | 0,78 |
| Fuel / air data | G25 gas delivery | Nm³/h | 18,6/24,2 - 40,2 |
| Fuel / air data | Net calorific value LPG gas | kWh/Nm³ | 25,8 |
| Fuel / air data | LPG gas density | kg/Nm³ | 2,02 |
| Fuel / air data | LPG gas delivery | Nm³/h | 6,2/8,1 - 13,4 |
| Fuel / air data | Fan | type | Centrifugal with forward curve blades |
| Fuel / air data | Air temperature | max °C | 40 |
| Electrical data | Electrical supply | Ph/Hz/V | 1/50/230 ±10% |
| Electrical data | Auxiliary electrical supply | Ph/Hz/V | -- |
| Electrical data | Control box | type | MG 569 |
| Electrical data | Total electrical power | kW | 0,450 |
| Electrical data | Auxiliary electrical power | kW | -- |
| Electrical data | Protection level | IP | X0D |
| Electrical data | Motor electrical power | kW | 0,25 |
| Electrical data | Rated motor current | A | 2 |
| Electrical data | Motor start up current | A | 8 |
| Electrical data | Motor protection level | IP | 20 |
| Electrical data | Ignition transformer | type | Incorporated in the control box |
| Electrical data | Ignition transformer | V1 - V2 | 230 V - 8 kV |
| Electrical data | Ignition transformer | I1 - I2 | 0,2 A - 12 mA |
| Electrical data | Operation | | Intermittent (at least one stop every 24 h) |
| Emissions | Sound pressure | dB (A) | 70 |
| Emissions | Sound power | W | -- |
| Emissions | CO emission | mg/kWh | < 40 |
| Emissions | NOx emission | mg/kWh | ≤120 |
| Approval | Directive | | 90/396/EEC, 73/23/EEC, 89/336/EEC, 92/42/EEC, 98/37/EEC |
| Approval | Conforming to | | EN 676 |
| Approval | Certification | | In progress |

**Reference conditions:**
Temperature: 20 °C
Pressure: 1013,5 mbar
Altitude: 100 m 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.*

# FIRING RATES




Useful working field for choosing the burner

1st stage operation range

**Test conditions conforming to EN 676:**
Temperature: 20°C
Pressure: 1013,5 mbar
Altitude: 100 m a.s.l.

# FUEL SUPPLY

## GAS TRAIN

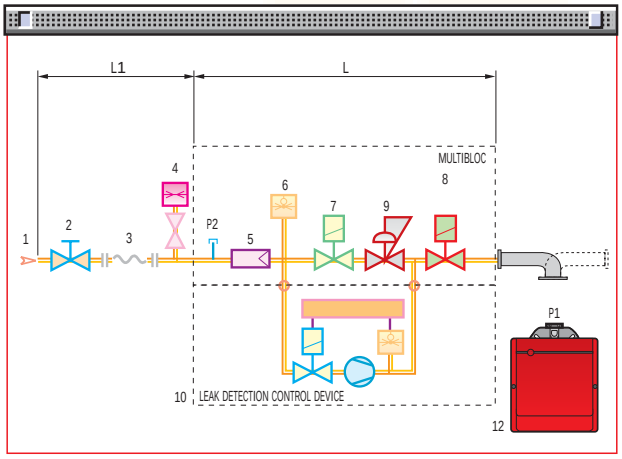
The burner is set for fuel supply from either the right or left hand sides.

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.

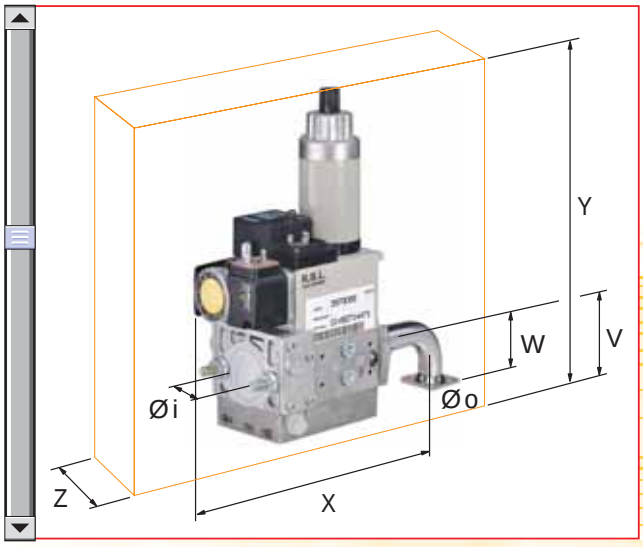
The gas train is Multibloc type, containing the main components in a single unit, and a valve seal control (as accessory) can be fitted.

*Gas train installed on the burner*

### MBZRDLE 410 - 412 - 415




| | |
|---|---|
| 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 1st and 2nd stage:<br>firing delivery adjustment (rapid opening)<br>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 |
| P1 | Combustion head pressure |
| P2 | Upstream pressure from the filter |
| 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 maximum dimensions of the gas trains that can be fitted to Gulliver RS5D burner, intake diameter and the coupling flange to the burner.

MULTIBLOC

| Name | Code | Ø i | Øo | X mm | Y mm | W mm | Z mm | V mm | mbar max* |
|---|---|---|---|---|---|---|---|---|---|
| **MBZRDLE 410** | 3970542 | 1" 1/4 | FLANGE 3 | 259 | 315 | 47 | 145 | 55 | 300 |
| **MBZRDLE 412** | 3970543 | 1" 1/4 | FLANGE 3 | 259 | 315 | 47 | 145 | 55 | 300 |
| **MBZRDLE 415** | 3970582 | 1" 1/2 | FLANGE 3 | 330 | 350 | 47 | 100 | 80 | 300 |

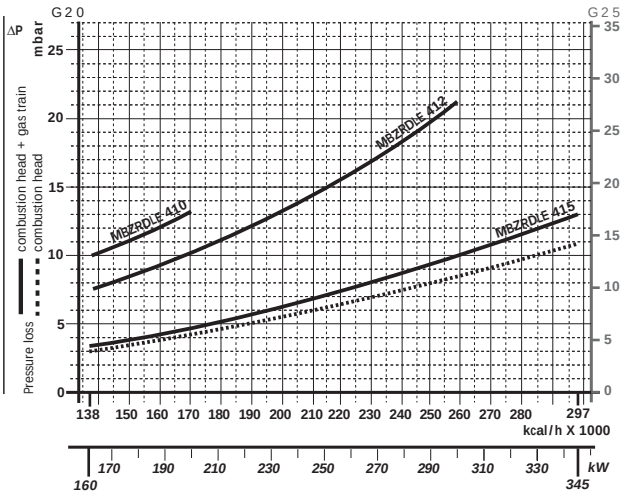
* max inlet gas pressure (mbar)

## PRESSURE DROP DIAGRAM

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.

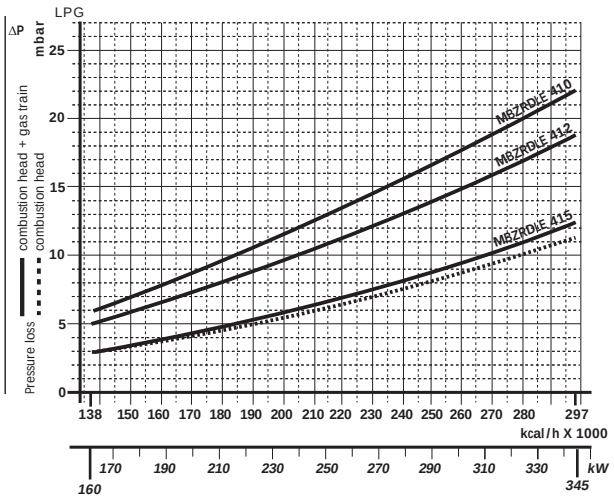
***NATURAL GAS***

**RS5D**




***LPG***

**RS5D**




| Gas train | Code | Output | Plug and socket |
|---|---|---|---|
| **MBZRDLE 410** | 3970542 | ≤ 200 kW* | • |
| **MBZRDLE 412** | 3970543 | ≤ 300 kW* | • |
| **MBZRDLE 415** | 3970582 | - | • |

* With natural gas.

**note** *For pressure levels different from those indicated above, please contact Riello Burners Technical Office.*
*In LPG plants, Multibloc gas trains do not operate below 0°C.*
*They are only suitable for gaseous LPG (liquid hydrocarbons destroy the seal materials).*

# VENTILATION

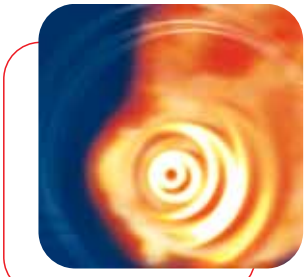
The ventilation circuit ensures low noise level with high performance of pressure and air delivery, inspite of their compact size.

*Air suction*

*Air pressure switch*

The burner is fitted with an adjustable air pressure switch, conforming to EN 676 standards.

# COMBUSTION HEAD



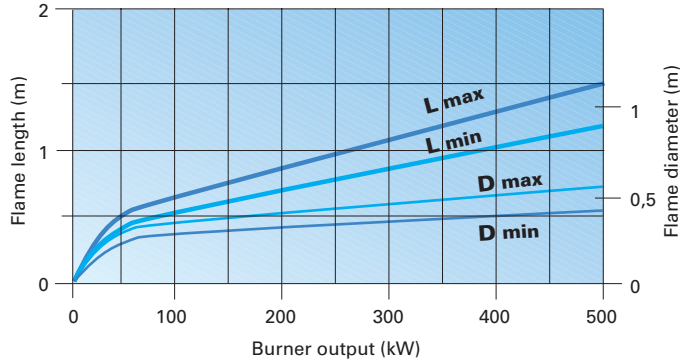
The combustion head in Gulliver RS5D burner is the result of an innovative design, which allows combustion with low polluting emissions, while being easy to adapt to all various types of boilers and combustion chambers.

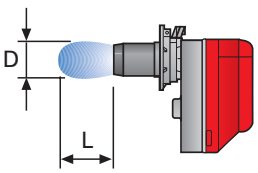
*Combustion head*

*Mobile coupling flange*

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.

**Dimensions of the flame**




*Example:*
*Burner thermal output = 350 kW;*
*L flame (m) = 1,2 m (medium value);*
*D flame (m) = 0,6 m (medium value)*

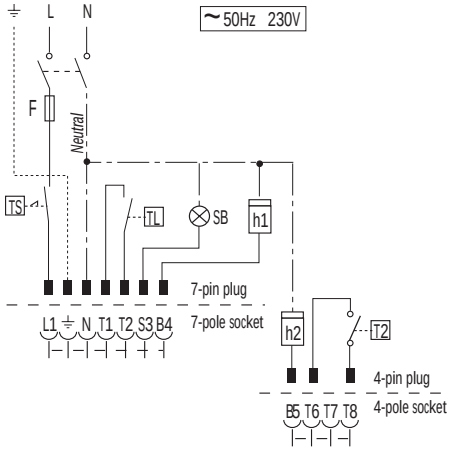
# WIRING DIAGRAMS

Control - box fitted with ignition transformer

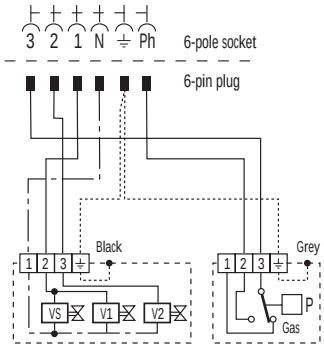
Electrical connections must be made by qualified and skilled personnel, in conformity with the local regulations in force.

## "TWO STAGE" OPERATION

### Burner electrical wiring




### Gas train electrical wiring



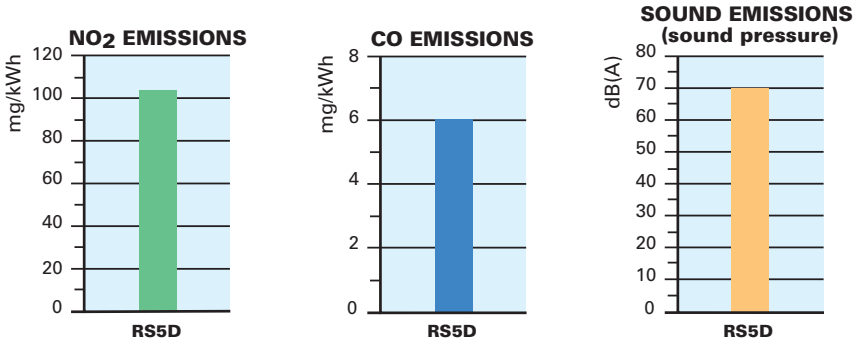

**h1** - One stage counter hours (230V 0,1A max)
**h2** - Two stage counter hours (230V 0,1A max)
**SB** - Remote lock out signal (230V 0,1A max)
**TL** - Limit thermostat
**TS** - Safety thermostat (manual reset)
**T2** - Two stage thermostat
**VS** - Safety valve
**V1** - One stage valve
**V2** - 2nd stage valve
**P** - Gas pressure switch
**F** - Fuse

The following table shows the supply lead sections and types of fuse to be used.

| Model | RS5D |
|---|---|
| | 230V |
| F A | T6A |
| L mm² | 1 |

F = Fuse L = Lead section

## EMISSIONS



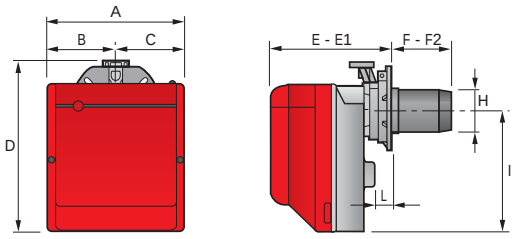

The emission data have been measured in the RS5D at maximum output, in conformity with EN 676 standard.

Special attention has been paid to noise reduction. This model is fitted with sound-proofing material inside the cover.

## OVERALL DIMENSIONS (mm)

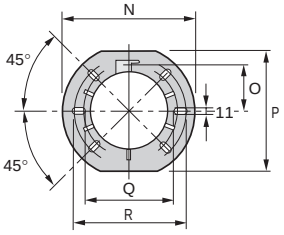
Thanks to certain construction features, this model can be fitted to any boiler on the market.

### BURNER



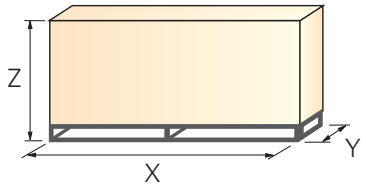

| Model | A | B | C | D | E | E1 | F | F2 | H | I | L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RS5D | 300 | 150 | 150 | 392 | 278 | 300 | 203 | 225 | 137 | 286 | 45 |

### BURNER-BOILER MOUNTING FLANGE




| Model | N | O | P | Q | R |
|---|---|---|---|---|---|
| RS5D | 218 | 80,5 | 203 | 170 | 200 |

### PACKAGING




| Model | X | Y | Z | kg |
|---|---|---|---|---|
| RS5D | 590 | 335 | 420 | 18 |