

# **TECHNICAL INSTRUCTIONS**

**10/10/95**

***MODELS MZ 20-40 CHEM and MZ 20-40 VENT***

**CE** approved

**GEMINOX**

**T30.17067**

# I - INTRODUCTION

## 1. DESCRIPTION

Wall-mounted condensing boiler, MZ 20-40 C VENT 16.5/32.8 kW, MZ 20-40 C CHEM 17.9/35.8 kW for hot water heating, category II 2 H 3 P, with two operational settings, type B 23 or C 12 or C 32, with air-gas controlled premixing burner, in accordance with EN 437 (June '93), Pr EN 483 (April '93) and Pr EN 677 (Dec. '93).

The settings are controlled either by a two-stage thermostat or an external thermostat available as an option.

The following parts come fitted in a plain and stylish cover:

- \* high-performance condensing exchanger comprising finned tubes.
- \* dual-setting premixing burner (with stainless steel heat-resistant grate).
- \* a safety and gas control valve assembly with pressure governor.
- \* control panel and electrical fittings which regulate the boiler and ensure its smooth operation:
  - ionisation flame control
  - radiator temperature control thermostat two-stage
  - water flow rate safety device
  - flue temperature overheat stat (85°C)
  - fan air flow rate safety device controlled by a differential pressurestat
  - 100 °C overheat safety thermostat with manual reset
- \* heating circuit safety valve (3 bars).
- \* combined temperature/pressure gauge.
- \* condensate drainage siphon trap.
- \* circulating pump with degasser.

## 2. RANGE FEATURES

- Compact (330 mm deep).
- Sturdiness ensured by using an oversized exchanger.
- Very high operating efficiency

### "Heating Only" Model

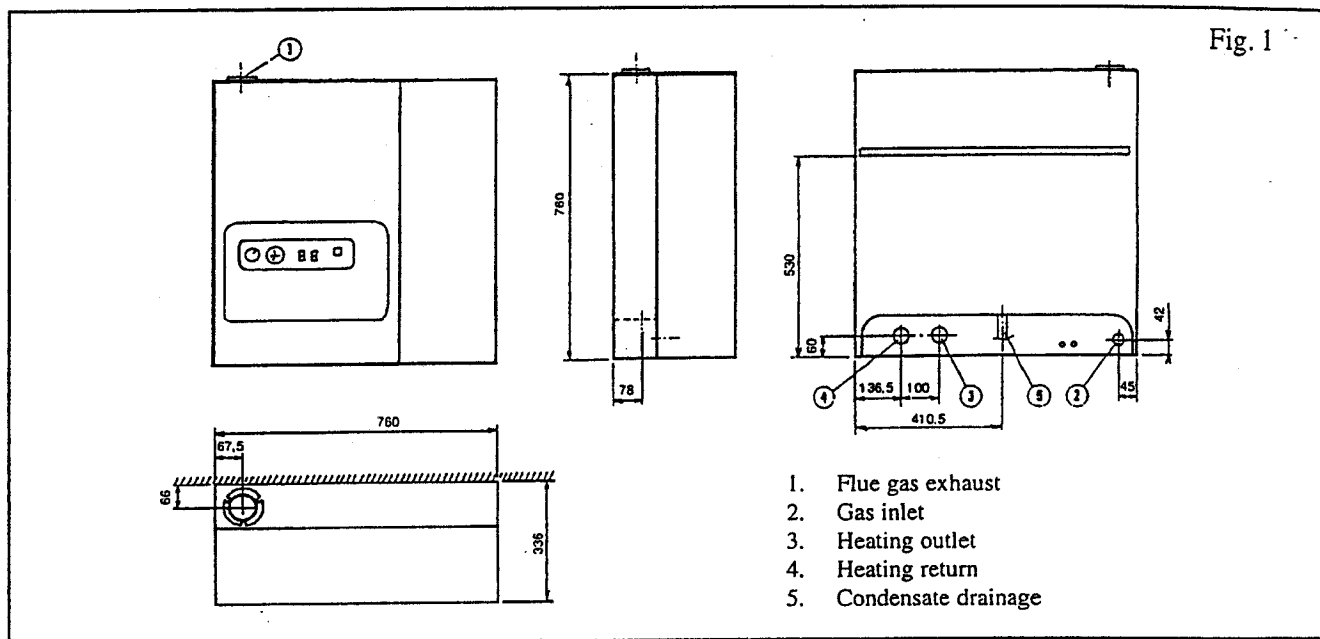
MZ 20-40 C CHEM for traditional flue with pipework

MZ 20-40 C VENT - room-sealed model with balance flue extraction

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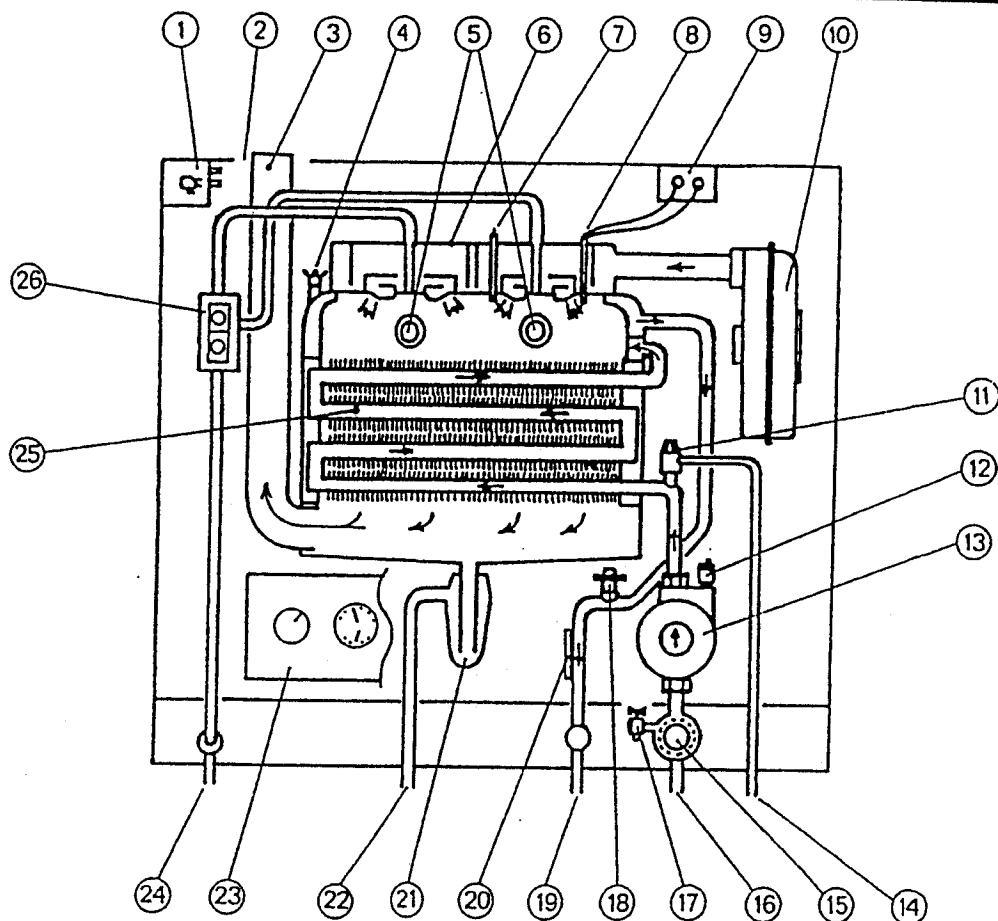
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## DIMENSIONS



## 4. MAIN COMPONENTS

Fig. 2



- |                                       |                                       |                                       |
|---------------------------------------|---------------------------------------|---------------------------------------|
| 1 - Differential air pressurestat     | 12 - Automatic air valve              | 23 - Control panel                    |
| 2 - Air inlet                         | 13 - Circulating pump                 | 24 - Gas inlet                        |
| 3 - Flue gas exhaust                  | 14 - Safety valve discharge           | 25 - Exchanger/condenser finned tubes |
| 4 - Thermal safety function           | 15 - Filter                           | 26 - Gas unit                         |
| 5 - Sight glass                       | 16 - Heating return                   |                                       |
| 6 - Dual-setting burner               | 17 - Boiler drain valve               |                                       |
| 7 - Ionisation electrode              | 18 - Flow rate detector               |                                       |
| 8 - Ignition electrode                | 19 - Heating outlet                   |                                       |
| 9 - High voltage ignition transformer | 20 - Aquastat and thermometer sensors |                                       |
| 10 - Fan                              | 21 - Siphon                           |                                       |
| 11 - Safety valve (3 bar)             | 22 - Condensate drainage              |                                       |

(see section II.3 for details)

## II - OPERATION/GENERAL

### 1. PRINCIPLE OF OPERATION

The wall-mounted condensing gas-fired boiler is a new type of boiler which makes maximum use of the heat energy produced by the gas combustion process. Using its "super-exchanger", combining the functions of exchanger and condenser, the boiler first recovers the sensible heat from the combustion products, with an efficiency of about 12% greater than that of a traditional boiler even without condensing. If the flue gases are evacuated at this stage of combustion, they are at temperatures of 200 °C to 300 °C. These flue gases still contain some of the sensible heat and in particular appreciable amounts of latent heat in the form of water vapour. By routing the heating return through the bottom of the exchanger/condenser at a temperature of less than 53°C, the flue gases will condense on the walls of the last rows of tubes. This condensation allied to the high performance of the exchanger results in an energy saving of up to 30% compared to traditional equipment. As the phenomenon of condensation only occurs for heating return temperatures of below 53 °C, the operating efficiency of the heating installation will increase as the average annual heating return temperature decreases.

## 2. CONTROL AND REGULATION

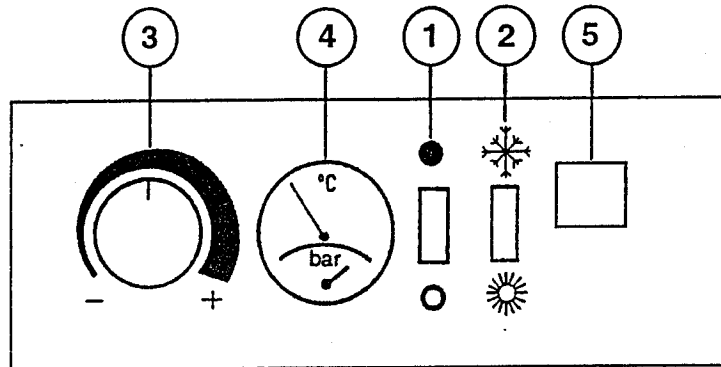
### A. CONTROL PANEL

This is equipped with the following:

- a main on/off switch (1)
- a summer/winter switch (2)  
winter setting provides heating and hot water  
summer setting provides hot water only
- a heating temperature control knob (20 to 80 °C) (3)

- a combined temperature and pressure gauge, showing the heating output temperature and the installation water pressure (minimum pressure 1 bar, 14.5 psi) (4)
- a warning light with manual reset, operating in the event of a flame fault (5)

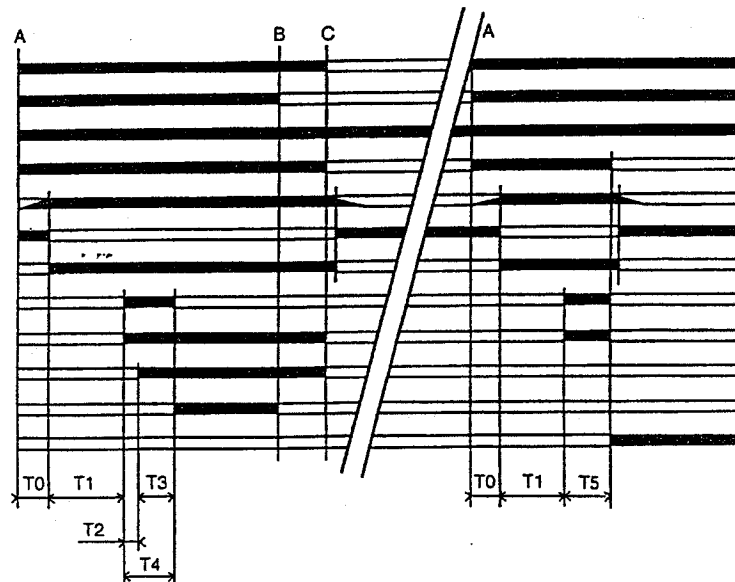
Fig. 3



### B DIAGRAM SHOWING OPERATING CYCLES

Fig. 4

Aquastat setting 1  
Aquastat setting 2  
Circulating pump  
Fan  
Air pressure  
Air pressurestat NC  
NO  
Ignition transformer  
Gas solenoid valve 1  
Ionisation  
Gas solenoid valve 2  
Safety warning light



#### Key to diagram

T0: Increase in air circuit pressure (fan starts): ~10 secs

T1: Prepurge: 10 secs

T2: Ignition time: 0.5 secs

T3: Post-ignition time: 4.5 secs

T4: 2nd stage ignition period

T5: Time required for safety device to function if no ignition ionisation: max. 5 secs

A - Boiler thermostat 1st and 2nd setting on

B - Boiler thermostat 2nd setting off (switches to setting 1)

C - 1st setting off (boiler off completely)

## 3 BURNER

### A INTRODUCTION

The gas boiler has a pre-mixed, fan-assisted burner. The flame is ignited on a heat-resistant stainless steel grate.

This technique gives a perfect gas mixture and a combustion which is sharp, silent, and well-adapted to the boiler combustion unit.

The burner is ignited in two stages. The right-hand burner is ignited first of all. It is checked by the control unit - 5 seconds later, gas is fed to the second burner and ignited by the first.

**MODEL 1:** Burner with one double solenoid valve and one safety solenoid valve.

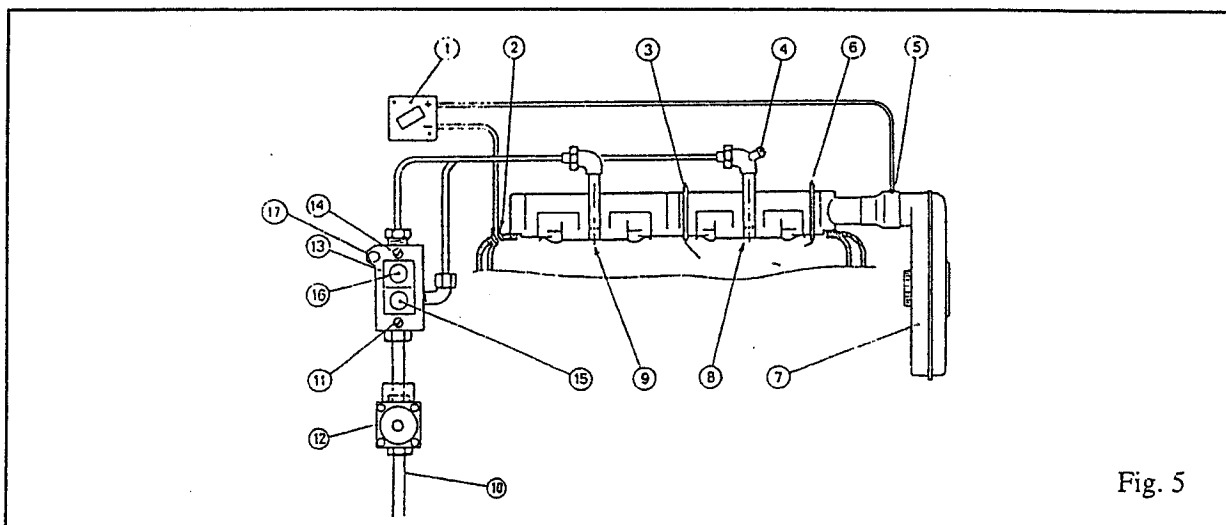


Fig. 5

**MODEL 2:** Burner with two double solenoid valves.

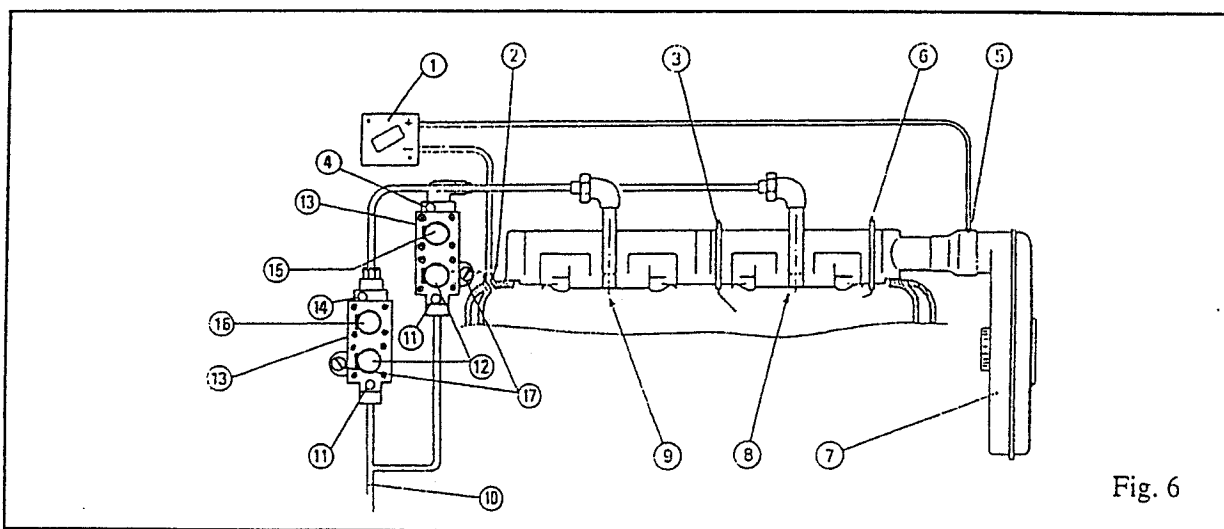


Fig. 6

- |                                      |                       |                                       |
|--------------------------------------|-----------------------|---------------------------------------|
| 1. Differential air pressurestat     | 6. Ignition electrode | 12. Safety solenoid valve             |
| 2. Furnace pressure point            | 7. Air fan            | 13. Gas unit                          |
| 3. Ionisation electrode              | 8. Burner 1           | 14. Gas burner 2 pressure point (P22) |
| 4. Gas burner 1 pressure point (P21) | 9. Burner 2           | 15. Burner 1 solenoid valve (SV1)     |
| 5. Burner air pressure point         | 10. Gas inlet         | 16. Burner 2 solenoid valve (SV2)     |
|                                      | 11. PI inlet pressure | 17. Gas pressure governor             |

## III - INSTALLATION

### 1. GENERAL REQUIREMENTS

Installing a wall-mounted gas boiler presents no particular difficulty.

The installation of the boiler must be carried out by a competent person in accordance with the relevant requirements of the Gas Safety (Installation and Use) Regulations, Building Regulations, Model Water Byelaws and the Building Standards (Scotland) Regulations. It must also comply with the current I.E.E. Wiring Regulations and the relevant recommendations of the following British Standard Codes of Practice:

- CP.331.3 Low pressure installation pipes.
- BS.5449.1 Forced circulation hot water systems.
- BS.5546 Installation of gas hot water supplies for domestic purposes.
- BS.5440.1 Flues (for gas appliances of rated input not exceeding 60 kW).
- BS.5440.2 Air supply (for gas appliances of rated input not exceeding 60 kW).
- BS.6798 Boilers of rated input not exceeding 60 kW.

**NOTE :** *The boiler is only suitable for installation in a sealed system and must not be used with an open vented system.*

#### LOCATION OF BOILER

The boiler can be installed on the inner face of an external wall — and some internal walls — providing they are flat, vertical and capable of adequately supporting the weight of the boiler and any ancillary equipment.

The boiler may be installed in any room or internal space, although particular attention is drawn to the requirements of the current I.E.E. Wiring Regulations and, in Scotland, the electrical provisions of the Building Regulations applicable in Scotland with respect to the installation of the boiler in a room or internal space containing a bath or shower. Where installation is in a room containing a bath or shower, any electrical switch or boiler control utilising mains electricity should be situated so that it cannot be touched by a person using the bath or shower.

Where installation will be in an unusual location, special procedures may be necessary and BS.6798 gives detailed guidance on this subject.

A compartment used to enclose the boiler **MUST** be designed and constructed specially for this purpose. An existing cupboard or compartment may be used provided it is modified for the purpose. Details of essential features of cupboard/compartment design, including airing cupboard installations, are given in BS.6798.

In siting the boiler, the following limitations **MUST** be observed :

1. The proposition selected for installation **MUST** allow adequate space for servicing in front of the boiler and for air circulation around the boiler.
2. This position **MUST** also permit the provision of a satisfactory balanced flue termination.

**NOTE :** *If the boiler is to be fitted in a timber framed building, it should be fitted in accordance with the British Gas publication "Guide for Gas Installations in Timber Frame Housing". Reference DM2. If in doubt, advice must be sought from the Local Gas Region of British Gas.*

When siting the boiler, provision must be made for the disposal of the condensate, see Section 4 — Condensate drain.

The pressure relief valve connection should be routed to an external, visible point where the discharge of steam or water cannot create a hazard to persons or property. BS.5449: 1 refers.



## **GAS SUPPLY**

Installation pipes should be fitted in accordance with CP.331.3.

The complete installation must be tested for soundness and purged in accordance with CP.331.3.

## **FLUEING**

Detailed recommendations for flueing are given in BS.5440.1. The following notes are intended for general guidance.

## **AIR SUPPLY**

Detailed recommendations for air supply are given in BS.5440.2. The following notes are intended for general guidance.

Where the boiler is to be installed in a room or internal space, the boiler does not require the room or internal space containing it to have a permanent air vent.

Where the boiler is to be installed in a cupboard or compartment, permanent high and low level air vents are required for cooling purposes in the cupboard or compartment. Both vents must communicate with the same wall to outside air.

The minimum effective area of the permanent air vents required in the cupboard or compartment are given in Table 3

**Table 3 AIR VENT AREAS**

<b>Position of Air Vents</b>	<b>Air From Room or Internal Space</b>	<b>Air Direct From Outside</b>
High Level	186 cm <sup>2</sup>	93 cm <sup>2</sup>
	29 in <sup>2</sup>	15 in <sup>2</sup>
Low level	186 cm <sup>2</sup>	93 cm <sup>2</sup>
	29 in <sup>2</sup>	15 in <sup>2</sup>

## **WATER CIRCULATION SYSTEM**

The expansion vessel is suitable for systems up to 80 litres water content. For systems in excess of this capacity an additional pressurised expansion vessel will be required. BS7074 and "British Gas Specifications for Domestic Wet Central Heating Systems' Part 3 gives guidance in this subject.

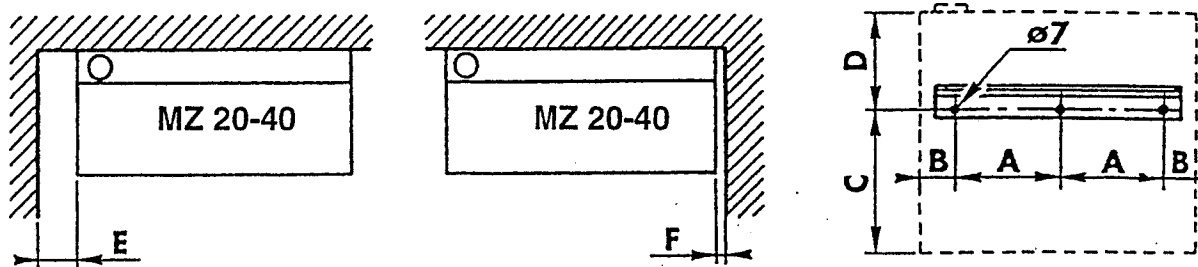
The central heating system should be in accordance with the relevant recommendations given in BS.6798 and, in addition, for small bore and microbore systems — BS.5449.1. The domestic hot water system, if applicable, should be in accordance with the relevant recommendations of BS.5546.

Copper tubing, to BS. 2871.1, is recommended for water carrying pipework.

## **ELECTRICAL SUPPLY**

Wiring external to the boiler must be in accordance with the I.E.E. Wiring Regulations and any local regulations.

## 2. FITTING ANGLE MOUNTINGS



	MZ 20-40 C	
Model	FLUE	BALANCED FLUE
B	300	300
B	80	80
C	495	495
D	265	265
E min	10	10
F min	10	10

Fig. 8

## 3. FITTING THE SPACER BRACKET (optional)

The spacer bracket is used to allow the pipes to pass behind the boiler when these enter from above.

### FITTING

1. Fasten the angle mounting, supplied with the boiler, to the wall.
2. Attach the spacer bracket to the mounting.
3. Attach the boiler to the spacer bracket.

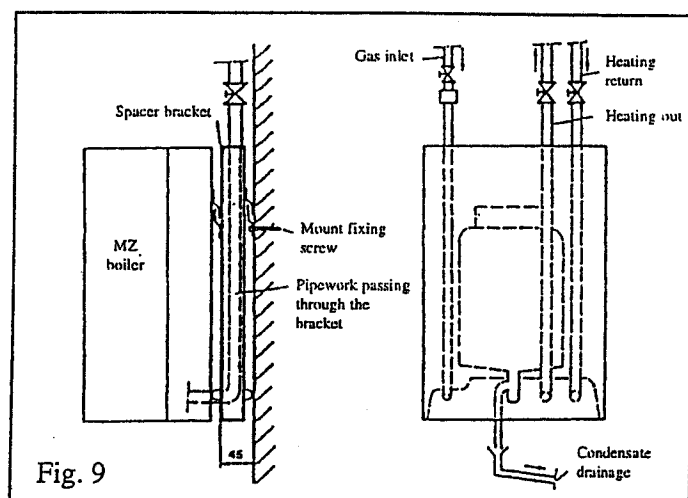


Fig. 9

## 4. FITTING THE CONNECTION BRACKET (optional - see special instructions)

The connection bracket allows the pipework of the installation to be prefabricated, before fitting the boiler. It is equipped with the boiler angle mounting. It also includes the supply of the stop valve to be connected to the gas pipe.

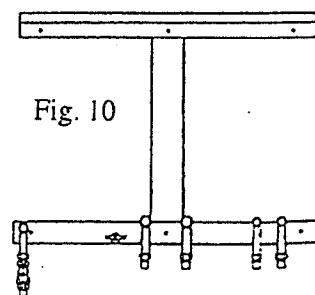
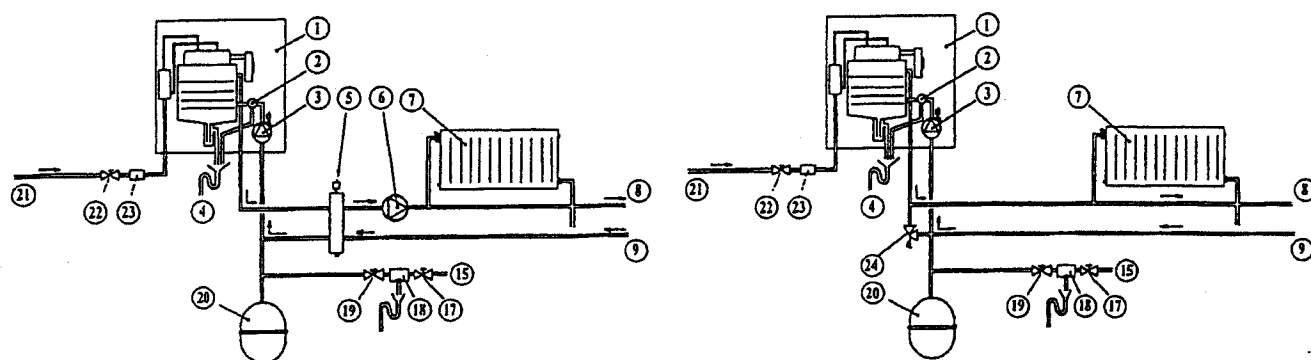


Fig. 10

## 5. PLUMBING CONNECTIONS

All connections are made through the base of the boiler (outlet, return, valve and condensate drainage). It is essential that the dimensions of the installation provide a nominal flow rate of 1500 l/hour through the boiler. If the regulating devices beyond the boiler are likely to reduce the flow rate, a differential relief valve or, better still, a mixing cylinder. The mixing cylinder has the advantage of providing total hydraulic independence of the boiler and heating installation circuits. The differential valve should be positioned a few metres from the boiler to leave a sufficient volume of water circulating in case of major recycling. When fitting a replacement device, rinse out the installation to remove any sludge which may be stagnating in low velocity areas.

Fig. 11



- |  |   |  |
|--|---|--|
| 1. MZ 20-40 boiler   | 8. Output   | 17. Stop valve   |
| 2. 3 bar safety valve (built into boiler)                  | 9. Return   | 18. Disconnecter with a non-controllable pressure zone to NF P 43011 |
| 3. Heating pump (built into boiler)                        | 10. Selector valve                                  | 19. Filling point  |
| 4. Condensate and valve evacuation towards drain           | 11. Domestic hot water production module            | 20. Expansion vessel with diaphragm                                  |
| 5. Mixing cylinder   | 12. Domestic hot water distribution                 | 21. Gas inlet  |
| 6. Heating pump (on "radiators" loop)                      | 13. Domestic cold water distribution                | 22. Gas stop valve   |
| 7. Radiators (including convectors and underfloor heating) | 14. Shut-off valve                                  | 23. Filter   |
|  | 15. Domestic water circuit inlet                    | 24. Differential valve   |
|  | 16. Domestic water safety unit calibrated to 7 bars |  |

### A LOW TEMPERATURE FLOOR HEATING

The MZ boiler is designed to be connected to a low temperature circuit. However, to limit the boiler output temperature, the stops located on the heating thermostat control knob (ref. 3, § II 2A) should be adjusted before commissioning: the maximum recommended setting is 45 °C "stops set to mark 9". An additional 60 °C safety thermostat must also be fitted on the installation outlet.

### B CONDENSATE AND VENTING CONNECTIONS

The wall-mounted gas boiler is designed to drain condensate (from the condenser and the combustion products flue\*) by a siphon trap at the bottom of the heating unit. The siphon trap, which can be accessed for inspection, should be connected in PVC Ø 32 mm to the waste water pipe by means of a vent with a siphon trap. When installing, remember to fill the siphon traps with water before commissioning. They should be inspected twice a year.

(\*) Only in the case of balanced flue models : - an air purge tee is compulsory at the base of the stack pipes.

### C PIPE CONNECTIONS

All the pipe junctions are located at the rear of the boiler. The heating return and heating outlet Ø 26/34 (1").

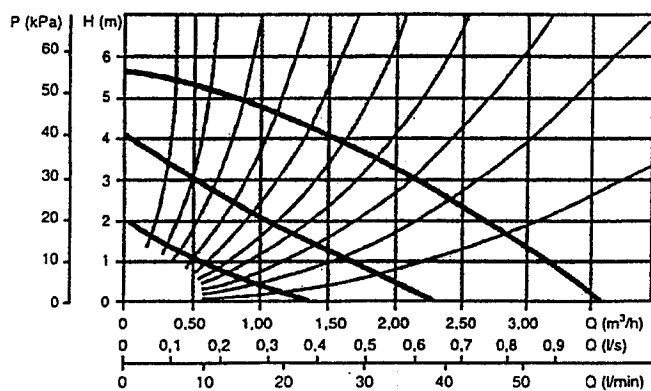
#### Connecting the system to the water supply

The boiler has an air purge valve on the pump degasifier. Ensure that the boiler and installation are properly purged by increasing the water pressure to at least 1 bar (pressure gauge). Check that it is fully purged again a few days after commissioning.

## D PRESSURE/FLOW RATE CURVES

PERFORMANCE CURVE

$\Delta P$  mWG MZ 20-40 pressure loss



UPS 25 60 A Circulating pump

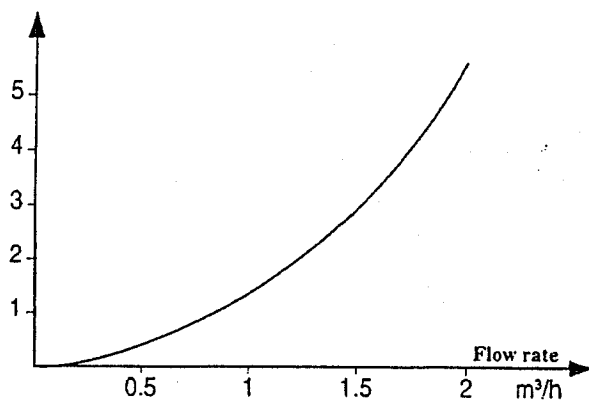


Fig. 12

## E WATER TREATMENT IN MULTI-METAL CLOSED CIRCUITS

A water treatment product is supplied with the boiler.

This must be added to the heating circuit when the installation is filled with water.

INIBAL: dose at 1 litre per 100 litres. If the installation is not new, ALWAYS flush it out using clear water before final filling.

### ANTIFREEZE

Attention! Only INIBAL ANTIFREEZE must be used, otherwise the boiler heating unit will not be covered by guarantee. INIBAL ANTIFREEZE provides protection against frost, against gas formation and against corrosion of multi-metal circuits. Where the installation has been treated with INIBAL ANTIFREEZE, the product supplied with the boiler does not need to be added.

### INIBAL ANTIFREEZE DOSING

The number of litres of INIBAL ANTIFREEZE to be introduced into the central heating circuit to reach the protection temperature (left-hand column) varies according to the system capacity in litres (top row of table).

Minimum protection temperature	Installation capacity in litres																
	10	20	30	40	50	60	70	80	90	100	120	140	160	180	200	250	300
- 8°C	2	3.5	5.5	7.5	9	11	13	15	17	18	22	26	30	33	37	46	55
- 10°C	2	4	6.5	9	11	13	15	17	20	22	26	30	35	40	44	55	66
- 12°C	2.5	5	7.5	10	12	15	17	20	22	25	30	35	40	45	50	62	75
- 14°C	3	5	8	11	14	16	19	22	25	28	33	39	44	50	55	70	80
- 16°C	3	6	9	12	15	18	21	24	27	30	36	42	48	54	60	75	90
- 18°C	3	6.5	9.5	13	16	19	22	26	29	32	38	45	51	58	64	80	95
- 20°C	3.5	7	10	13	17	20	24	27	30	34	41	48	54	61	68	85	100
- 22°C	3.5	7	11	14	18	22	25	29	32	36	43	50	58	65	72	90	108
- 24°C	4	7.5	11	15	19	23	27	30	34	38	41	53	61	68	76	95	114
- 26°C	4	8	12	16	20	24	28	32	36	40	48	56	64	72	80	100	120
- 28°C	4	8.5	13	17	21	25	29	34	38	42	50	59	67	76	84	105	126
- 30°C	4.5	9	13	18	22	26	31	35	40	44	53	62	70	79	88	110	132

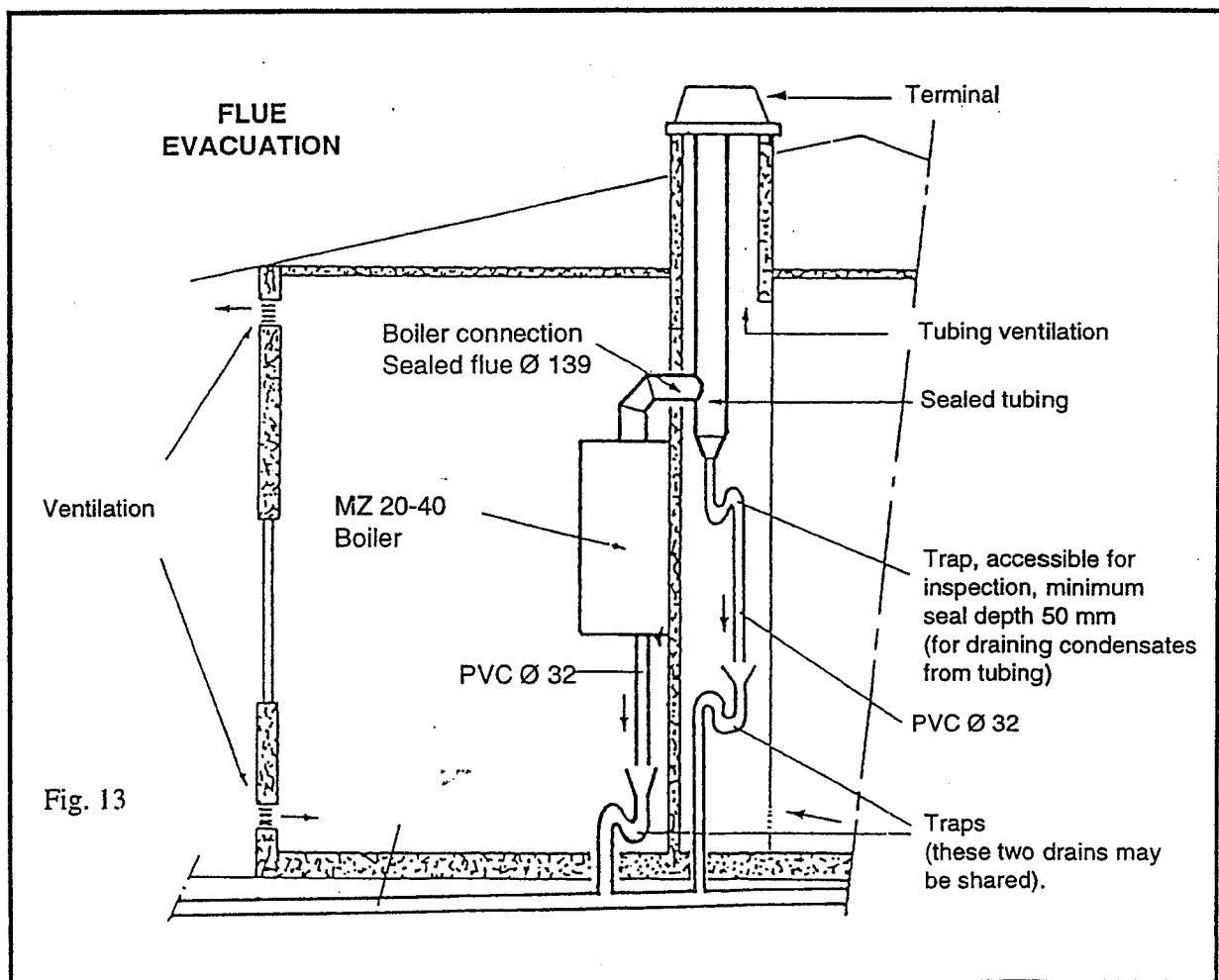
## 6. EVACUATION OF COMBUSTION PRODUCTS

## 6.1 - EVACUATION USING A TRADITIONAL FLUE (model B 23)

*General instructions:*

The MZ 20-40 is a condensing boiler, which means that a sealed flue has to be used. The combustion products are saturated with water vapour, which continues to condense on the walls of the tubing. The condensates therefore have to be collected at the base of the flue and directed to the drain. The condensates are acidic (pH 4), so the use of a non-corrodible flue is recommended.

**NOTE :** Avoid fitting pipes horizontally wherever condensate may build up. There should be a slope of at least 2% (lower point at boiler end).



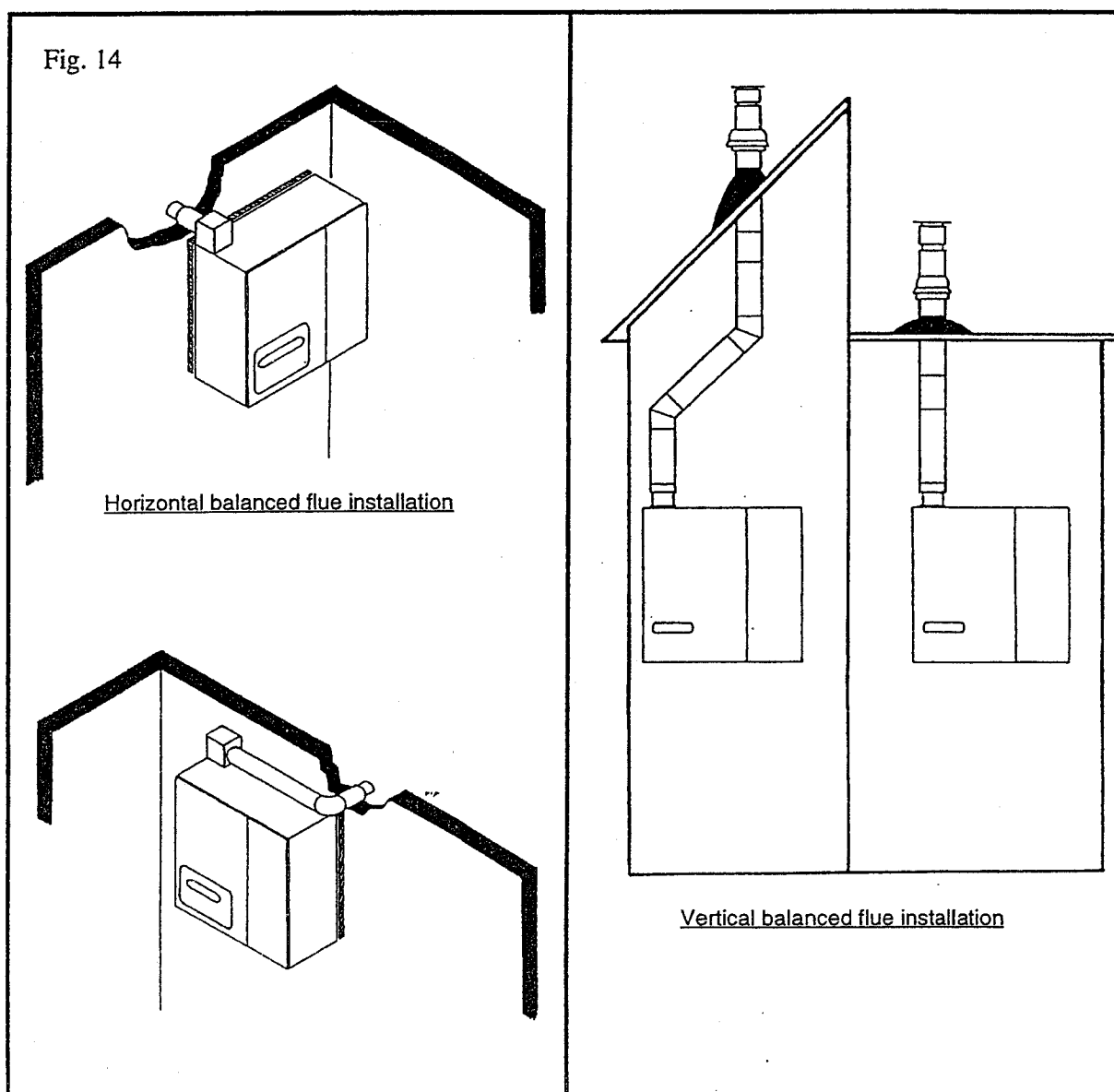
## 6.2 - EVACUATION USING A BALANCED FLUE

The MZ 20-40 sealed combustion circuit boiler can be connected to a horizontal or vertical balanced flue. In both types of connection, the boiler is independent of the ventilation conditions of the room in which it is fitted. A horizontal balanced flue can be installed when the outer side of the wall adjoining the boiler gives onto a well ventilated area.

Two concentric tubes supply air to the burner and evacuate the combustion products. The flues can be offset or deviated, allowing the installation to be adapted to most situations.

The roof terminal is specially designed to withstand rain, snow and wind from any direction.

### POSSIBLE INSTALLATION CONFIGURATIONS



(The standard version is supplied with a 0.6 m horizontal balanced flue)

## A - EVACUATION BY VERTICAL BALANCED FLUE (model C 32)

Fig. 15

- 0 - Boiler cover
- 1 - 90° bend piece, polypropylene, Ø 80 PP
- 2 - 45° bend piece, polypropylene, Ø 80 PP
- 3 - Heating unit
- 4 - Polypropylene tube, Ø 80 PP, L=410
- 5 - Aluminium adapter piece 110-125  
(specific parts for MZ 20-40)
- 6 - Concentric aluminium extension  
internal Ø: 80 mm - external Ø: 125 mm  
Length L = 500
- 7 - Concentric aluminium vertical terminal  
internal Ø: 80 mm - external Ø: 125 mm  
Length L = 1400 mm (sloping roof)
- 8 - Socket tile with ball joint can be adapted  
according to the roof slope and the type of  
roof covering
- 9 - Concentric 45° aluminium bend piece  
internal Ø: 80 mm - external Ø: 125 mm

Maximum length 10 metres with two 45° bend pieces.

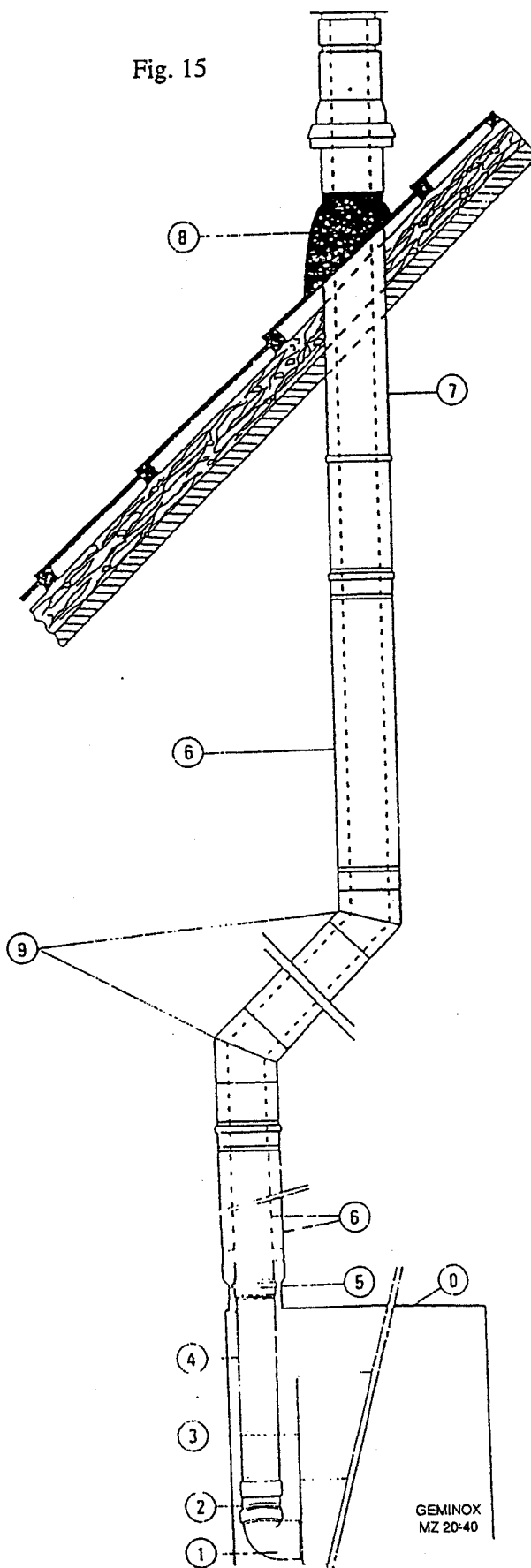
### Equivalent configurations:

For each 45° bend added, reduce the maximum length by 0.5 metres.

The maximum temperature of the boiler combustion products is 80°C

1 and 2: items supplied with the boiler

4 to 9: items to be ordered





### CONCENTRIC VERTICAL TERMINAL\*

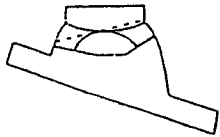
(approved in accordance with GDF CERUG specifications No. 91 1964, 5/7/91)

- 2 colours: Tile ---> concrete / terra cotta tiles  
Black ---> Slate / Shingle
- 1 length: sloping roof = L 1400 mm

Reference	Roof type	Colour	Length L (mm)	Internal dia. (mm)	External dia. (mm)
N 40.12227	Sloping	Tile	1400	80	125
N 40.12169	Sloping	Black	1400	80	125

\* Treated against corrosion

### SOCKET TILE WITH BALL JOINT

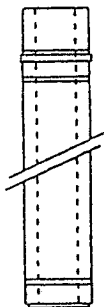


Reference	Slope	Roof covering	Colour
N 40.12165	25°-45°	Tile*	Tile
N 40.12166	35°-55°	Tile*	Tile
N 40.12167	35°-55°	Slate / Shingle	Black

\* Suitable for all types of tile  
For flat tile < 8 mm use Slate model  
Using any accessories of a different brand shall automatically invalidate our guarantee of watertightness.

### EXTENSION

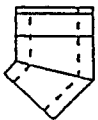
- Sealed socket coupling
- Concentric, internal diameter 80 mm, external diameter 125 mm



Reference	Length (mm)
N 40.12168	500

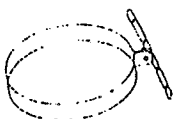
### 45° BEND PIECE

- Reference N 40.12170
- Sealed socket coupling
- Concentric, internal diameter 80 mm, external diameter 125 mm



### BOILER ADAPTER PIECE (supplied by boiler manufacturer)

- Condensation collection



### ROOF FLANGE Ø 131

- Reference B 00.12171
- Terminal fixing clamp



### POLYTHENE INTERIOR FINISHING PLATE

- Reference A 90.12172
- Colour : black



## **B - EVACUATION BY HORIZONTAL BALANCED FLUE (model C12)**

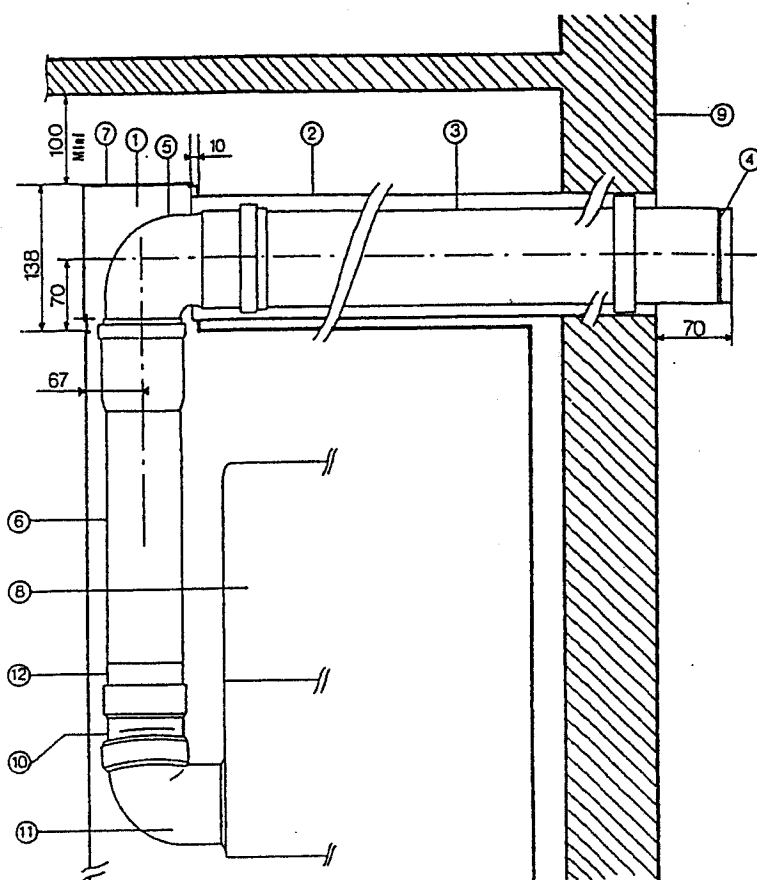
### **A - FITTING THE BALANCED FLUE**

The following operations must be carried out after a hole has been drilled (using the template) through the wall to allow the passage of a Ø 110 tube and after the boiler has been fixed to the wall. The hole should be drilled in such a way as to impose a slope of 2% rising towards the outside, in order to prevent water from dripping from the terminal. The balanced flue may be fitted to the right or left of the boiler or directly behind it.

- 1 - Temporarily present the metal box (1) to the fixing holes in the frame.
- 2 - Measure the distance between the outside of the wall and where the Ø 110 PVC tube (2) enters the metal box (1).  
Cut the Ø 110 PVC tube (2) (on the boiler end) to this length + 10 mm  
Taper the outside of the tube using a file or a rasp to make it fit more easily into the metal box (1).
- 3 - Cut the Ø 75 PP tube (3) to the length of the Ø 110 PVC tube + 70 mm (take care to cut the boiler end and not the outside terminal (4) end).
- 4 - Engage the Ø 75 PP tube (3) into the Ø 110 tube (2) and place the two tubes inside the housing provided in the wall.
- 5 - Fit simultaneously the Ø 75 PP bend piece (5) and the metal box (1) on to the boiler (0).  
Fix the box (1) using the 4 screws supplied.
- 6 - Engage the Ø 75 tube (3) inside the bend piece (5) and the Ø 110 PVC tube (2) inside the metal box (1). To do this, it may be necessary to push on the tubes from the outside, particularly if the balanced flue outlet goes directly through the wall on which the boiler is fitted.
- 7 - On the wall, seal around the Ø 110 PVC tube (2), taking care not to block the gap between the two tubes on the outside.

Fig. 16

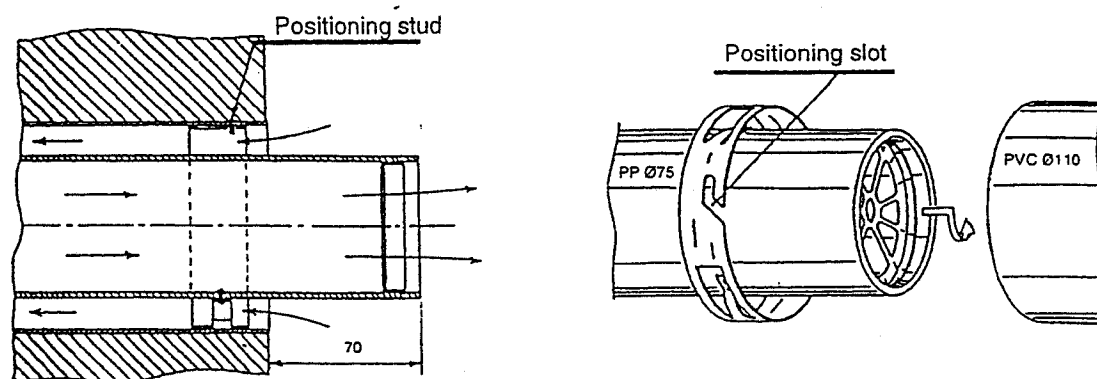
1. Metal box
2. Ø 110 PVC tube, l = 526
3. GREY Ø 75 PP tube without socket fitting, l = 600
4. Non-corrodible terminal for tube (3)
5. GREY Ø 75 90° bend piece
6. GREY Ø 75 PP tube, l = 350
7. Cover for metal box (1)
8. MZ heating unit
9. Wall
10. BLACK Ø 80 45° bend piece
11. BLACK Ø 80 90° bend piece
12. Ø 80 to 75 reduction tube



## B - DISMANTLING

- 1 - Open the cover (7) of the metal box (1) (remove the 2 knurled screws).
- 2 - Pull the vertical tube (6) upwards to release the bend piece. Then bring it forwards to clear it and pull it down hard to release it from the bend piece (5) located in the metal box (1).
- 3 - Simultaneously take both the metal box (1) and the PP bend piece (5) located inside it off the frame.
- 4 - Remove the inner combustion products exhaust tube from the balanced flue (3) by turning it slightly clockwise (from the terminal end) in order to free it (see instructions on p. 18).

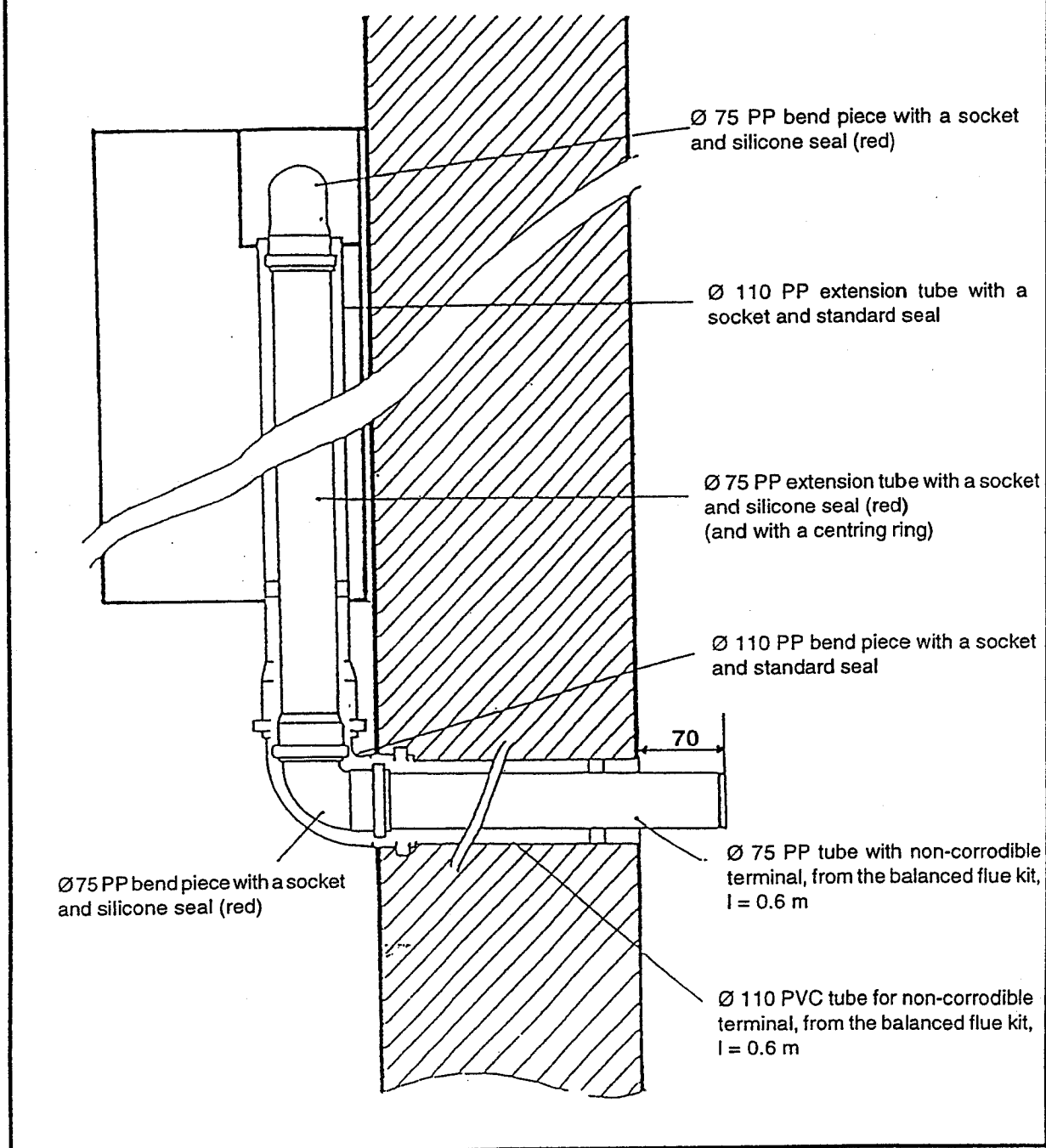
Fig. 17



**IMPORTANT:** Smear the silicone seal with a lubricating product or with soapy water, so that the PP Ø 75 bend pieces and tubes can be dismantled easily if this becomes necessary in the future (do not use mineral greases or oils).

## C - FITTING A DEVIATED BALANCED FLUE

Fig. 18



Maximum length of balanced flue: 2.5 metres

One bend piece is equivalent to a straight length of 1 metre

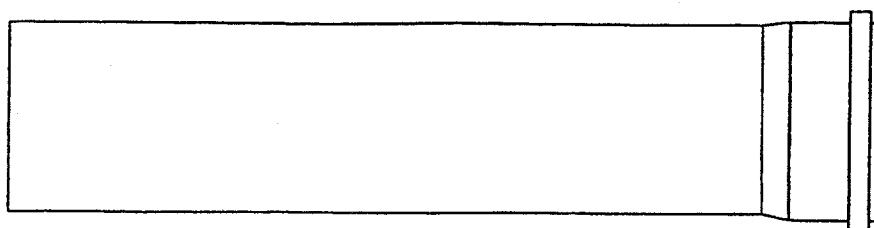
Thus a balanced flue with a bend piece cannot exceed (for example)

0.5 metres + 1 bend piece + 1 metre, or 1 metre + 1 bend piece + 0.5 metres

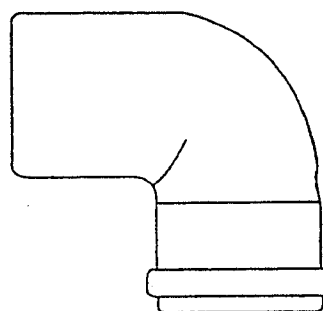
The extension pieces are supplied in lengths of 1 metre. When fitting, the  $\varnothing$  110 PP tube must be cut to a total length of 30 mm less than the total length of the  $\varnothing$  75 PP tube.

## Extension pieces for deviated MZ balanced flue

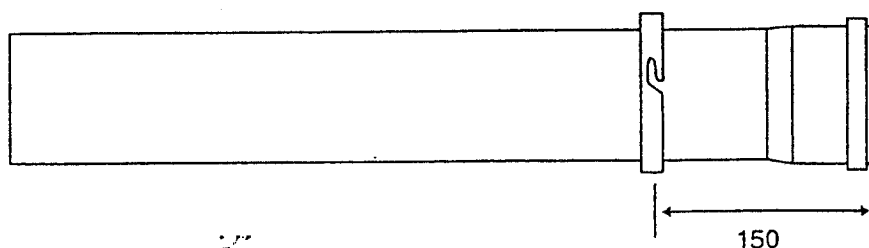
Air intake extension tube, 0.97 metres, Ø 110 PP  
with one socket and standard seal (black)



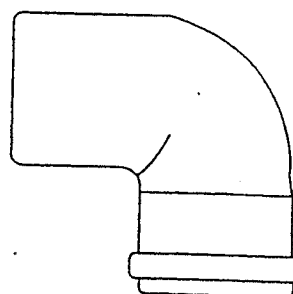
Air intake bend piece, Ø 110 PP  
with one socket and standard seal (black)

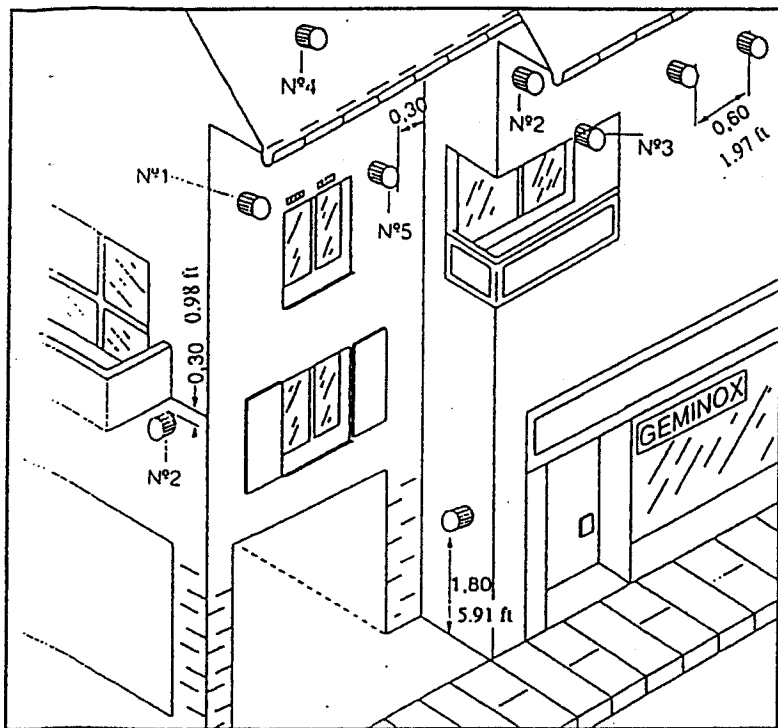


Flue gas extension tube, 1 metre, Ø 75 PP with centring ring  
and with one socket and silicone seal (red)

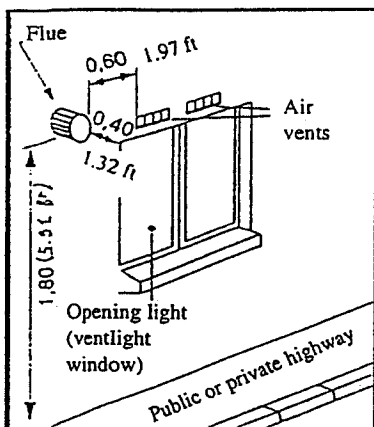


Flue gas bend piece, Ø 75 PP  
with one socket and silicone seal (red)





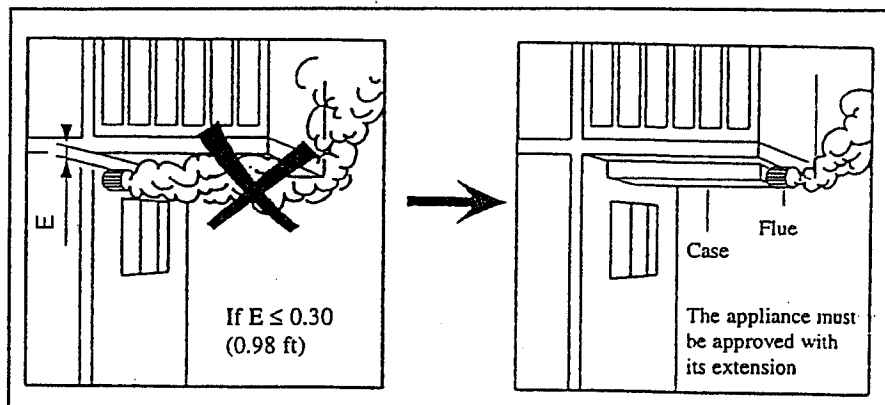
- no. 1 - The three statutory distances  
 no. 2 - Outlet under balcony or roof  
 no. 3 - Outlet on a balcony  
 no. 4 - Roof outlet (refer to factory)  
 no. 5 - Outlet near to a corner  
 (All dimensions are in metres and are the minimum permissible values)



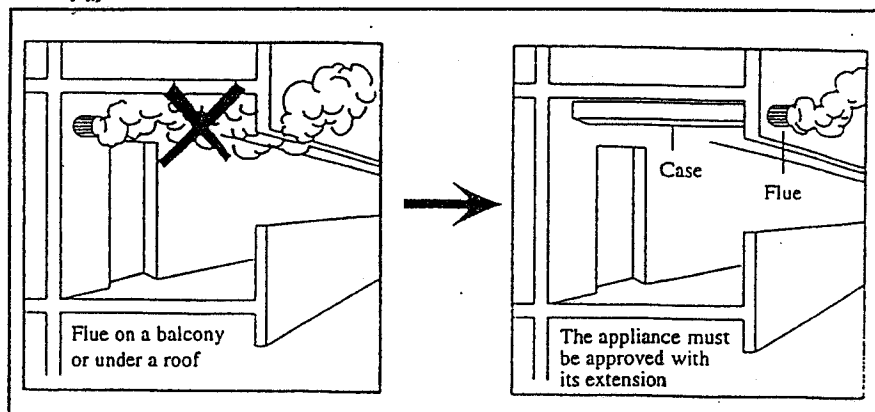
A public or private highway where a flue outlet is located includes

- public or private pavement
- pedestrianised street
- traffic route
- alleyway
- stairway (including landings and steps)

(no.1)



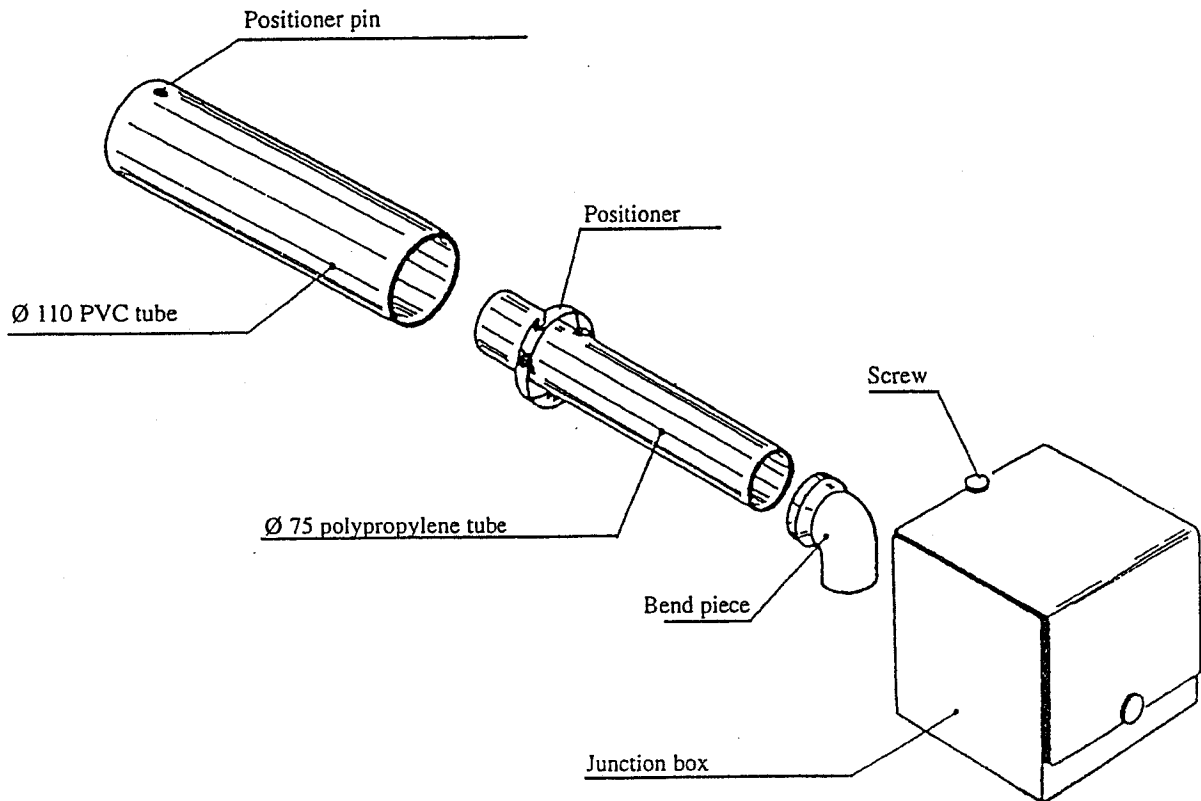
(no.2) Approved extension: 2.5 m (8.2 ft)



(no.3) Approved extension: 2.5 m (8.2 ft)

## SEALING

Fig. 20



The MZ 20-40 boiler with balanced flue has a sealed combustion circuit. Make sure that the various seals (cover, balanced flue casing, etc.) are kept in good condition. The various bend pieces and connections on the flueing and air suction circuits must be sealed when fitted to avoid CO<sub>2</sub> penetrating the fresh air intake. Use silicone paste to seal.

## 7. GAS CONNECTION

- The gas inlet diameter is 3/4" (20/27).

The gas supply pipe must be fitted with a 1/4 turn stop valve located in an easily accessible place.

After commissioning, check that the pressure tapping points are properly closed and check the general leak tightness of the gas circuit (for example using a foaming product or a U-tube).

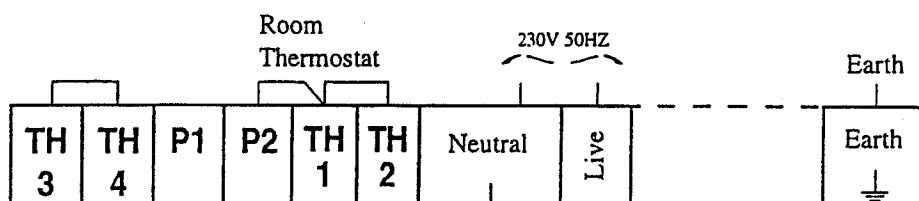
Always blow through the gas pipework before commissioning the appliance (in order to get rid of any particles produced by welding or threaded joints).

- The pipe supplying gas to the boiler must not cause a pressure loss of more than 1 mbar (10 mmWG). Example: Using LACQ type natural gas, for every 10 metres of pipe with 4 bends (1 bend  $\approx$  0.5 m), the minimum diameter will be 26/28 (refer to GDF design chart).

## 8. ELECTRICAL CONNECTIONS

### CONNECTION TO THE MAINS SUPPLY

Original wiring:  
(without governor)



#### ATTENTION!

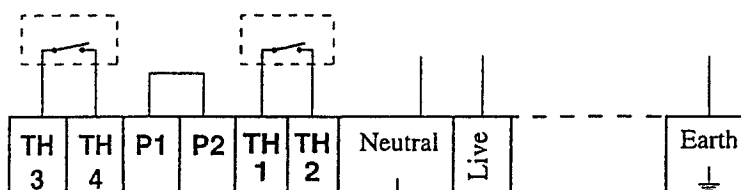
Observe the correct polarity for live and neutral

This appliance must be earthed

Electrical protection: protect the live connection with a 2.5 amp fuse.

#### Connecting an external control device

1. Burner activated by a room thermostat (or control device) with circulating pump in constant operation

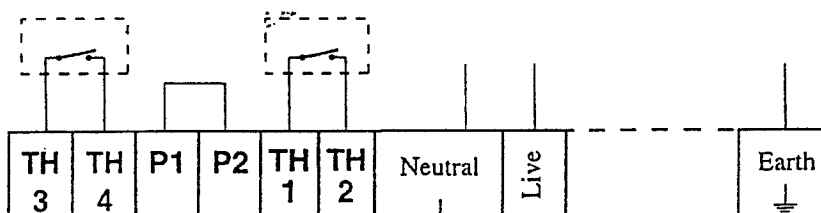


Replace the TH1-TH2 shunt with the room thermostat or governor

**Beware:** do not remove the P2-TH1 shunt (circulating pump shut down)

TH3/TH4: Terminals provided for control of 2nd burner setting (two-stage governor).

2. Burner and circulating pump simultaneously activated by the room thermostat (or a control device)



Replace the TH1-TH2 shunt with the room thermostat or governor.

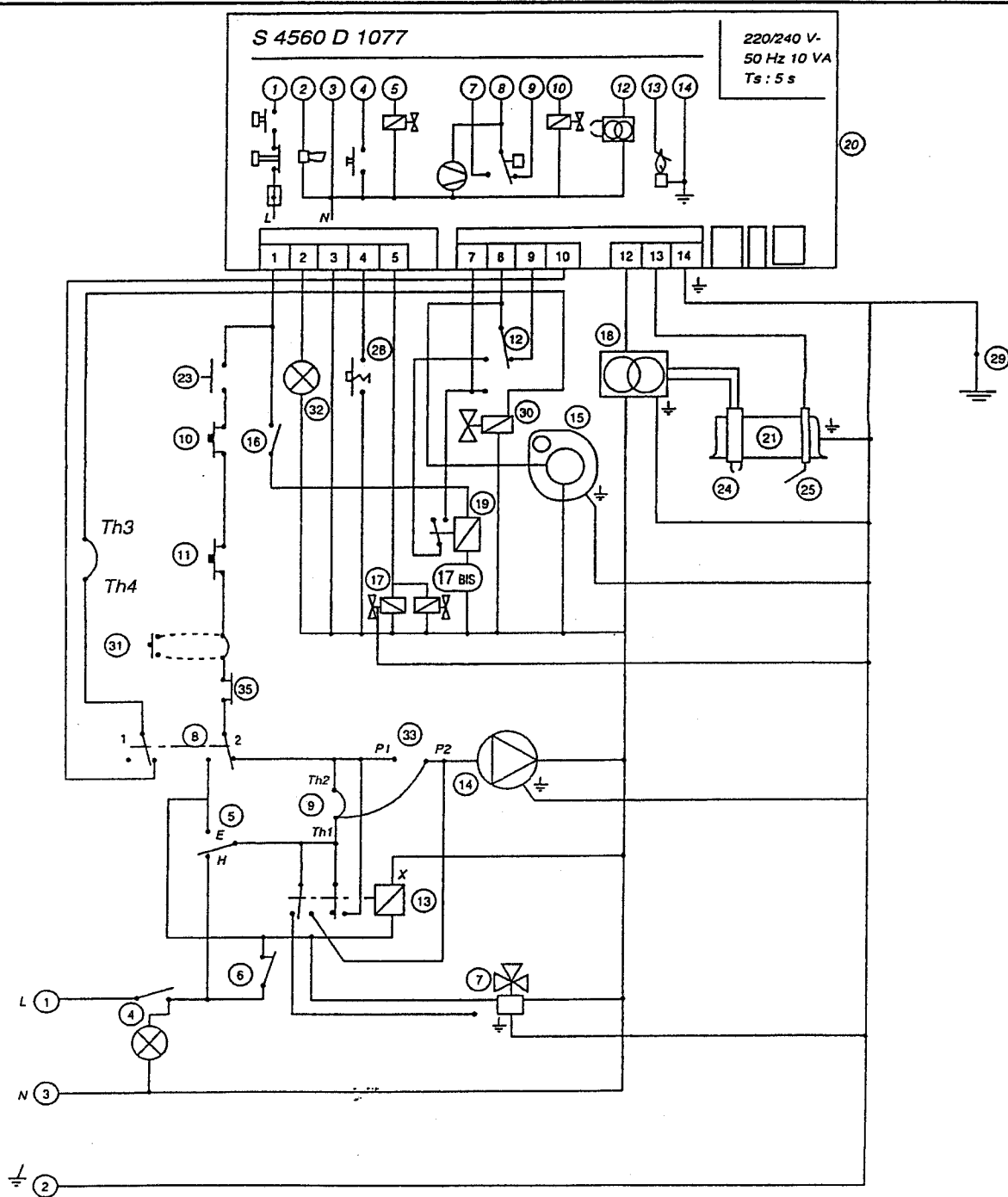
**Beware:** shunt to be moved from P2-TH1 to P2-P1. Do not remove the P2-P1 shunt (circulating pump shut-down).

TH3/TH4: Terminals provided for control of 2nd burner setting (two-stage governor).

# CIRCUIT DIAGRAM

MODEL 1: with one double solenoid valve and one safety solenoid valve

Fig. 21



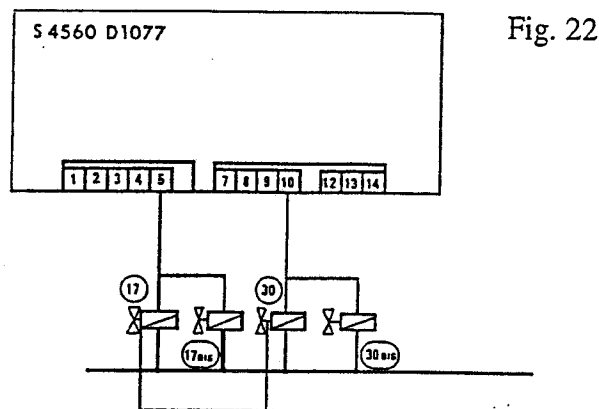
- |  |   |                                      |
|--|---|--------------------------------------|
| 1. Live                                | 10. Overheat safety aquastat (manual reset) | 19. Flow rate detector relay         |
| 2. Earth                               | 11. Flue gas temperature safety             | 20. Control unit                     |
| 3. Neutral                             | 12. Air pressurestat                        | 24. Double ignition electrode        |
| 4. Luminous on-off switch              | 13. Domestic water drawing point relay      | 25. Ionisation electrode             |
| 5. Winter/summer switch                | 14. Circulating pump                        | 28. Safety reset                     |
| 6. Domestic water temperature aquastat | 15. Fan                                     | 30. Gas solenoid valve - 2nd setting |
| 7. Three-way selector valve            | 16. Flow rate detector                      | 31. DHW module limiter aquastat      |
| 8. Boiler temperature control aquastat | 17. Gas solenoid valve - 1st setting        | 32. Safety warning lamp.             |
| Room thermostat shunt                  | 17b. Safety solenoid valve                  | 33. Pump control shunt               |
|  | 18. Ignition transformer                    | 35. Limiter (only on MZC)            |

\*W module



**MODEL 2:** with two double solenoid valves.

- 17. Gas solenoid valve - 1st setting
- 17b Safety solenoid valve - 1st setting
- 30. Gas solenoid valve - 2nd setting
- 30b Safety solenoid valve - 2nd setting



## IV - COMMISSIONING

Before commissioning the appliance, the installer should:

- check that the gas circuit is leaktight
- check that the flue gas outlet is leaktight and that combustion products can pass freely through this conduit;
- check that the installation is filled with water,  $P = 1.5$  bars (21.75 psi), the radiators are bled and the valves open (Attention! the pressure must not drop below 1 bar (14.5 psi);
- check that the electricity supply is connected correctly: 230 V 50 Hz, with correct polarity;
- check that the condensate outlet is connected;
- check that the siphon trap is filled with water.

When operating the appliance for the first time, the installer must verify

- that the governor works properly;
- that the flame control works properly;
- the CO, CO<sub>2</sub> burner setting

Make sure that:

the installation is filled with water and properly purged  
the electricity supply is correct - 230 V, 50 Hz, 6 amp fuse  
the boiler has the right fuel needed for operation  
the burnt gas flue is not blocked  
the safety features are in perfect working order

### COMMISSIONING

- 1 Open the manual valve on the gas inlet
- 2 Switch on the main heating switch
- 3 Set the on/off switch on the control unit to the on position
- 4 Put the CIRCULATING PUMP switch to the "winter" position. In the "summer" position, the circulating pump only works when the domestic hot water tank requires heating when the domestic hot water tank, which may be coupled up to the boiler, requires heating.
- 5 Burner adjustment: this is factory preset to obtain satisfactory operation. However, when commissioning, it is necessary to carry out the following verifications, with the burner operating:

## A CHECK OPERATING PRESSURE

P1: Supply pressure

P2: Burner n° 1 input pressure

P3 : Valve output pressure to burner n° 2

Adjusting the pressure governor (item 17, paragraph II 3A)

- Turn to the right to increase the pressure

- Turn to the left to decrease the pressure

(increase or reduce flow rate)

## B CHECK GAS FLOW RATE

Flow rates provided at 15°C and 1013 mbar.

### GAS FLOW RATE CHECKING CHART

**MODEL 1:** Burner with one double solenoid valve and one safety solenoid valve

GAS TYPE			NAT. GAS H		NAT. GAS L		PROPANE	
			MZ 20-40C CHEM	MZ 20 40C VENT	MZ 20-40C CHEM	MZ 20 40C VENT	MZ 20-40C CHEM	MZ 20 40C VENT
Operating Pressure	P21	mbar	5.7	4.9	7.5	5.4	2.2	2.0
	P22	mbar	7.7	6.8	10.3	9.1	30.0	26.0
Gas valve output reducer Ø		mm	6.40	6.40	6.40	6.40	6.40	6.40
Burner union reducer Ø		mm	without	without	without	without	2.4	2.4
Gas flow 15°C 1013 mbar	Setting 1	m <sup>3</sup> /h	2.02	1.84	2.35	2.14	1.49	1.35
	Setting 2	m <sup>3</sup> /h	3.93	3.58	4.57	4.16	2.89	2.63

**MODEL 2:** Burner with two double solenoid valves.

GAS TYPE			NAT. GAS H		NAT. GAS L		PROPANE	
			MZ 20-40C CHEM	MZ 20 40C VENT	MZ 20-40C CHEM	MZ 20 40C VENT	MZ 20-40C CHEM	MZ 20 40C VENT
Operating Pressure	P21	mbar	12.0	10.5	16.0	14.5	18.0	17.0
	P22	mbar	12.0	10.5	16.0	14.5	18.0	17.0
Burner union reducer Ø		mm	4.40	4.40	4.40	4.40	2.8	2.8
Gas flow 15°C 1013 mbar	Setting 1	m <sup>3</sup> /h	2.02	1.84	2.35	2.14	1.49	1.35
	Setting 2	m <sup>3</sup> /h	3.93	3.58	4.57	4.16	2.89	2.63

The propane flow rates are given in kg/hour.

## C CHANGING GAS TYPE

This operation must be carried out by a qualified professional. The governor must be sealed after adjustment.

The boiler is preset for G20 type H natural gas.

- To change to G25 type L natural gas, adjust the gas flow using the pressure governor (paragraph II 3A, item 17).

- To change to Propane, fit a 240 dia. (gas valve BM 762.012) / 280 dia. reducer (Theobald TK 25 S 5 A gas valve) to each burner union connection, replace the springs on each governor with the red springs supplied in the kit and then set the pressure governor (the two GPL reducers are supplied with the boiler).

Check for gas leaks with a foaming product after refitting.

## V - SERVICING

A service check must be carried out annually. The main points to be verified are as follows:

1)

That the combustion gas circuit, the fan and burner are clean and that the ignition and ionisation electrodes and seals are all in good condition.

The burner can be cleaned using a household vacuum cleaner, placing the suction pipe on the air intake, then on the gas intake (with the burner dismantled).

The exchanger can be cleaned by spraying with water with the burner dismantled (the water drains away via the condensate drainage siphon trap).

2)

Check the gas flow rate, P2 pressure, CO and CO<sub>2</sub>. A correctly adjusted appliance should provide the following combustion results (cover fitted and boiler at around 70°C).

NATURAL GAS	PROPANE
% CO <sub>2</sub> between 8.5 and 9%	9.5 and 10%
% CO less than 50 ppm	50 ppm
% NO <sub>x</sub> less than 30 ppm	50 ppm

**ATTENTION!** The combustion products circuit is slightly pressurised.

Any holes drilled in this circuit should subsequently be closed off.

3)

Check the flame control by disconnecting the ionisation electrodes (the safety device should activate after attempting to ignite the flame).

4)

Check the differential air pressurestat by blocking the air inlet or flue gas outlet (burner operation should be interrupted immediately).

**ATTENTION!** The differential air pressurestat is a safety device. Never modify its setting without simultaneously measuring the differential pressure (triggers at 2.1 mbar  $\Delta P$  on MZ 20-40 C VENT and 2.7 mbar  $\Delta P$  on MZ 20-40 C CHEM)

If the pressurestat triggers, this indicates insufficient air flow; in this event, check the fan and the air and combustion products circuits (flue, burner, exchanger, condensate chamber, etc.).

5)

Check the water flow detector (by stopping the circulating pump; burner operation should be interrupted immediately).

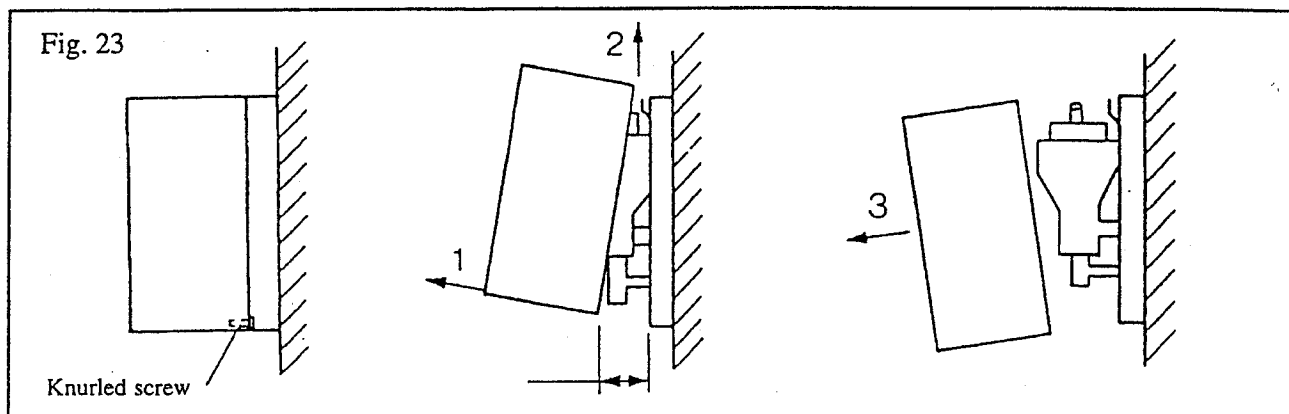
6)

Inspect the condensate drainage trap.

## VI - ASSEMBLY/DISMANTLING

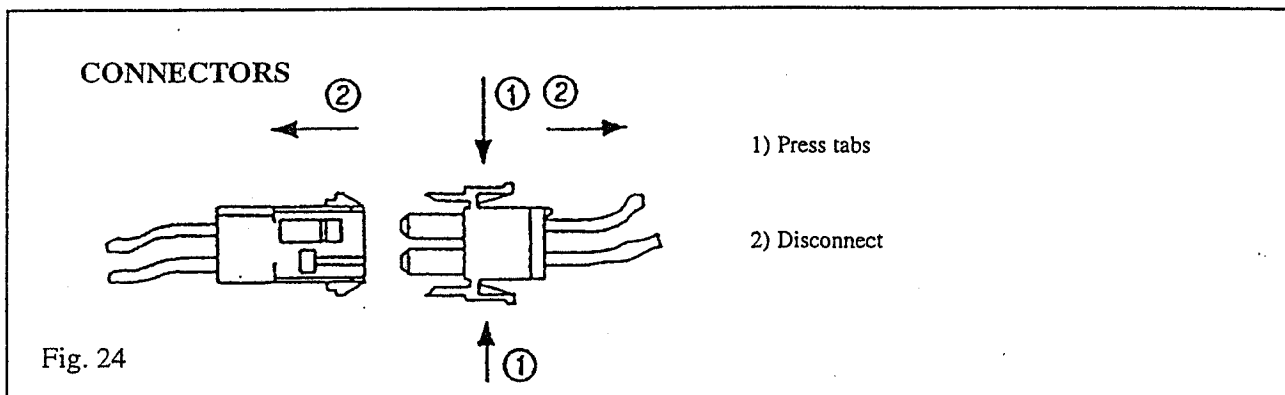
### COVER

The boiler cover is fixed at the bottom by two knurled screws.



### ELECTRICAL CONNECTION UNIT

The various electrical devices are all connected to the control unit by special connectors which prevent any incorrect connection after dismantling.



### BURNER

Electrode adjustment

Fig. 25

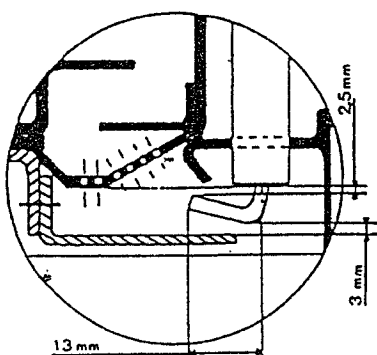
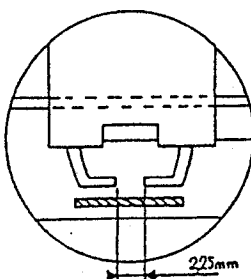
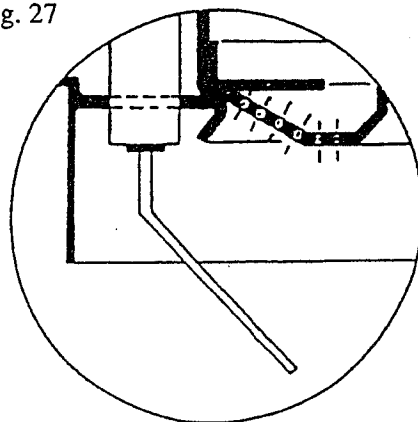


Fig. 26



Ignition electrode

Fig. 27



(S 4560 D 1077 control unit)

230 V - 50 Hz



*Full power operation until one of the control elements cuts in*

## C THERMAL PROTECTION SAFETY DEVICES

The heating unit is fitted with two bimetallic safety thermostats with a manual reset function, one calibrated to 100°C for the water temperature overheat stat and the other calibrated to 85°C for the flue temperature overheat stat.

## D ACCESSORIES

The wall-mounted gas boiler incorporates the accessories needed for the smooth operation of a heating installation: circulating pump, safety valve, purger, drain tap, pressure gauge, heating water filter and condensate drainage siphon trap.

## B GAS UNIT

- **Gas governor** (item 17 fig. 6)

The gas governor ensures the correct heat output from the appliance by regulating the gas burner pressure whatever the supply pressure (max input  $P = 50$  mbar).

- **Gas valve**

The gas valve is equipped with solenoid valves which control the gas supply to the burner. These solenoid valves, have a low power consumption (8 W each) and can operate constantly and silently.

- **Filter**

The unit input is fitted with a screen filter which protects it against any impurities carried in the gas supply.

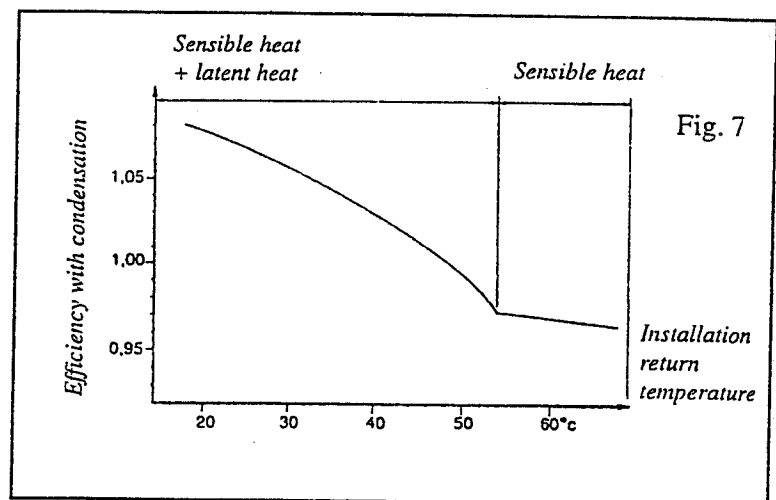
## 4. FAN

The fan, specially developed for the boiler, has high air flow and acoustic performances. Its turbine provides a flow rate with a low sensitivity to pressure variations.

## 5. CONDENSER

A "super exchanger" combines the functions of exchanger (upper part) and condenser (lower part). Condensation occurs on the tube walls where the temperature is below the dew point for the combustion products.

Condenser efficiency curve



## 6. HEATING UNIT

The heating assembly has a particularly well-designed body consisting of two distinct parts:

- a) The square-section upper part constitutes the cold combustion chamber with its surrounding layer of water. A sight glass allows the flame to be observed.
- b) An aluminium "super exchanger" with horizontal fins captures almost all the sensible and latent heat contained in the combustion products.