

Designed by

ED BOULTER

INSTALLATION AND INSTRUCTION MANUAL

MODEL 45/65, 65/95, 100/150 AND 150/185

FLOOR STANDING OIL FIRED BOILERS

A range of magic oil-fired boilers for any home.

Contents

Forward 1

1.1 Owners/Users Instructions 2

1.5 - The Controls 3

1.5.4 - Indicator Lights on Fascia 3

1.6 - Automatic Burner Operation 4

1.6.2 - The Burner Control Box 5

1.6.5 - Boiler Thermostat Settings 6

1.6.6 - Switching the Boiler Off 6

1.6.8 - Maintenance 6

2.1 Technical Information - Boiler Dimensions 7

2.2 - Suitability and Specification 8

2.4 - Burner Setting and Data 9

2.5 - Control Panel Wiring Diagram 10

3.1 - Regulations and Standards 11

- Baffle Assembly for 45/65 and 65/95 ... 12

- Baffle Assembly for 100/150 13

- Baffle Assembly for 150/185 14

FORWARD

Dear Owner, Installing Engineer and Service Engineer,

Merlin boilers are designed and made to operate quietly and reliably at high efficiency and to comply with the O.F.T.E.C. Oil Fired Appliances Standard OFS A100.

All models have a water cooled bottom and top. A large access door for servicing is at the front. Models up to 95000 Btu/h will fit under a kitchen worktop.

Easy clean baffles are fitted and there are no awkward corners or crevices inside the boiler to clean once the baffles are removed.

Elegantly simple, robust white stove enamelled casings are fitted as standard.

The boilers are suitable for connection to conventional chimneys.

Additionally

All models are convertible to Balanced Flue Boilers.

When fitted with an Oil Boiler Warehouse Ltd Balanced flue they offer considerable flexibility and freedom to fit the boiler in the most advantageous position including utility rooms, garages and outhouses.

In balanced flue mode air for combustion is piped from outside the building directly to the specially sealed burner. The boiler becomes a room sealed balanced flue unit without the use of complicated and vulnerable sealing tapes glued to casing panel edges.

Horizontal Balanced Flue Kits are supplied for Low Level or High Level (2 metres) rear and side discharge.

Extensions are available to pass through walls thicker than average.

Vertical Balanced Flues to pass through flat or pitched roofs are also available.

We have endeavoured to make this booklet as helpful as possible to the owner, installing engineer and service engineer.

Thank you for reading this and for choosing a Merlin.

Yours sincerely

H E Boulter

PS. I and my team of design engineers are proud of the Merlin range.

Our policy is one of continuous improvement and innovation and extension of the range.

SECTION ONE - OWNERS/USERS INSTRUCTIONS

1.1 Should you consider it necessary to remove any covers or dismantle any parts of the boiler.

ENSURE THAT THE ELECTRICITY SUPPLY TO THE BOILER IS SWITCHED OFF

1.2 When the boiler is fitted it is essential that it is commissioned by a qualified engineer before being put to work.

Your installing engineer may be qualified and in possession of the instruments necessary for this purpose.

It is the responsibility of the installing engineer to commission or to ensure that the boiler is commissioned as specified in BS5410 Part 1.

Should any difficulty occur in ensuring that the commissioning is performed, we at Oil Boiler Warehouse Ltd will be pleased to suggest a suitably (preferably OFTEC) qualified engineer.

1.3 The correct fuel to be burned by the boiler as despatched is 28 seconds Class C Oil.

28 SECONDS VISCOSITY CLASS C OIL

The boiler can burn 35 Sec. Viscosity Class D fuel. This necessitates the fitting of a smaller atomising nozzle, adjusting the oil pressure and air settings and we strongly advise that the burner be modified by including a nozzle line oil pre-heater to ensure clean combustion.

NOTE: THAT THE USE OF 35 SECONDS FUEL IS NOT PERMITTED ON LOW LEVEL BALANCED FLUES.

1.4 The Heating System and its Controls

Central Heating/Domestic Hot Water systems vary considerably depending on building design, owners preference, the degree of sophistication desired and the installing engineers preference.

It is important that the operation of the controls incorporated in the system are explained to you.

The boiler is fitted with a water temperature thermostat and safety thermostat to switch the oil burner on or off to control the water temperature leaving the boiler as explained below (1.5)

SECTION ONE - OWNERS/USERS INSTRUCTIONS

Your system may have other controls which may switch the electrical supply to the boiler on or off depending on air temperature in the building and/or domestic hot water temperature.

It is important that the installing engineer explains to you how the system is controlled.

THE CONTROLS

1.5 The boiler controls are concealed behind the front door of the boiler. This pulls off with the aid of the door pulls at the sides of the door.

1.5.1 BOILER SWITCH

This controls the electrical supply to the boiler thermostats and the burner.

1.5.2 BOILER THERMOSTATS

The adjustable thermostat switches the burner on and off and is sensing the temperature of the water in the boiler.

If the water temperature is below the figure set by the adjusting knob the burner will fire until the temperature of the water, as set, is reached.

An additional safety/limit thermostat is fitted inside the housing. This is pre-set and will switch the burner off should the water reach the pre-set temperature to prevent overheating. This thermostat will reset itself when the water temperature has fallen sufficiently.

Each thermostat has a phial which is inserted into a pocket on either side at the top of the boiler body. A capillary tube leads to the thermostat.

1.5.3 Sockets are located in the bottom of the thermostat housing for the electrical supply to the boiler and power supply to the burner.

The two sockets are quite different and the plugs cannot be interchanged.

THE INDICATOR LIGHTS ON THE FASCIA

1.5.4 GREEN - MAIN SUPPLY INDICATOR

Providing the external controls such as the Mains switch for the heating system, time switch or programmer and system thermostats are on or calling for heat this will glow when the boiler switch is ON.

1.5.5 AMBER - BURNER INDICATOR

This will glow when the boiler thermostats are calling for heat. This indicates that power is being supplied to the burner and that it is firing or about to fire. When the thermostat switches off because the set temperature is reached this light goes out.

1.5.6 RED - LIMIT INDICATOR

This will glow if the water temperature in the boiler has exceeded the temperature set on the adjustable thermostat.

It signifies that the limit thermostat has switched the burner off and there may be a fault in either the adjustable thermostat or a water circulation fault in the heating system.

IF THIS light glows more that very occasionally please contact your engineer.

1.5.7 RED - LOCKOUT INDICATOR

This will glow when the control box fitted on the burner has either

(a) attempted unsuccessfully to fire or

(b) sensed that the flame has become unstable or extinguished when firing.

Removal of the front door or the boiler will reveal that the red button on the black control box fitted to the burner is also glowing.

The burner will not attempt to fire again until the red button is pressed.

Please see 1.6.3 and 1.6.4.

1.6 AUTOMATIC OPERATION OF THE BURNER

The automatic pressure jet burner has an electric motor driving fuel pump and a fan. The fuel is pressurised by the pump and emitted through an atomising nozzle as a fine spray. Air for combustion from the fan is mixed with the tiny droplets of oil to produce a clean stable flame.

Ignition of the oil/air mixture is by high tension spark generated by an ignition transformer.

1.6.1 STARTING THE BOILER

1. Ensure that there is enough fuel in the tank and the valve controlling the supply to the boiler is open.

2. Switch on the mains electrical supply to the boiler.

3. Check that the time clock or programmer and room thermostat are on or calling for heat.

4. Switch on the main switch on the boiler control panel. THE GREEN MAINS LIGHT ON THE BOILER FASCIA WILL GLOW.

5. Set the knob on the thermostat high enough to call for heat. THE AMBER BURNER LIGHT ON THE FASCIA WILL GLOW and the burner will start.

1.6.2 THE BURNER CONTROL BOX

A control box and a light sensitive photo resistor control the operation and start/stop sequence of the burner.

Power to the control box is controlled by the boiler water temperature thermostat.

When power is supplied to the burner the motor starts and the control box and photoresistor establish a high tension spark for ignition.

After 12 to 15 seconds the oil is released by the solenoid valve and flame established. The ignition spark operates for 12 to 15 seconds after the flame is established. The burner will fire until the water reaches the temperature set on the thermostat.

Should the flame become unstable or extinguish the ignition will again switch on.

If the flame does not regain stability or does not re-establish in 15 seconds the control box lockout timer will operate and the light will glow in the control box lockout button.

1.6.3 LOCKOUT - RED LOCKOUT LIGHT ON THE FASCIA PANEL WILL GLOW

This indicates that the burner has attempted to start or has attempted to re-establish an unstable flame whilst firing.

1.6.4 TO RESET LOCKOUT AND RESTART BURNER

Remove the front panel of the boiler.

The reset button on the burner control box will be glowing red.

Press and release the reset button. The light will extinguish and the burner will commence the start sequence. The motor will run for 15 seconds and the burner will then fire.

Should the burner not fire correctly the burner will stop and the red indicators on the boiler fascia and the control box will again glow.

WAIT 3 MINUTES BEFORE AGAIN RESETTING THE LOCKOUT BUTTON

IF THE BURNER AGAIN GOES TO LOCKOUT DO NOT ATTEMPT TO RESTART.
PLEASE CALL YOUR SERVICE ENGINEER.

1.6.5 RECOMMENDED BOILER THERMOSTAT SETTINGS

It has been found that most systems prove to be satisfactory with the following temperature settings.

WINTER - HEATING AND HOT WATER 80° C

SUMMER - HOT WATER ONLY 65° C

BOILER LIFE MAY BE AFFECTED IF THE BOILER IS OPERATED FOR LONG PERIODS WITH A THERMOSTAT SETTING OF LESS THAN 60°C

1.6.6 SWITCHING THE BOILER OFF

The boiler may be switched off by any of the following

A. SWITCH OFF THE MAINS SWITCH ON THE BOILER CONTROL PANEL.

B. SELECT OFF ON THE SYSTEM PROGRAMMER OR TIME SWITCH.

C. SWITCH OFF THE MAINS HEATING SYSTEM SWITCH.

THE GREEN MAIN INDICATOR ON THE BOILER FASCIA WILL EXTINGUISH

1.6.7 SWITCHING OFF FOR THE SUMMER

1. Switch off the electrical supply as 1.6.6.
2. Shut the oil supply valve.
3. Have the boiler serviced to remove deposits which could induce corrosion during the idle period.

1.6.8 MAINTENANCE

It is recommended that the boiler be serviced by a qualified, preferably OFTEC registered engineer.

FUEL - 28 Secs Viscosity Class C Kerosene - ONCE ANNUALLY
FUEL - 35 Secs Viscosity Class D Heating Oil - TWICE ANNUALLY.

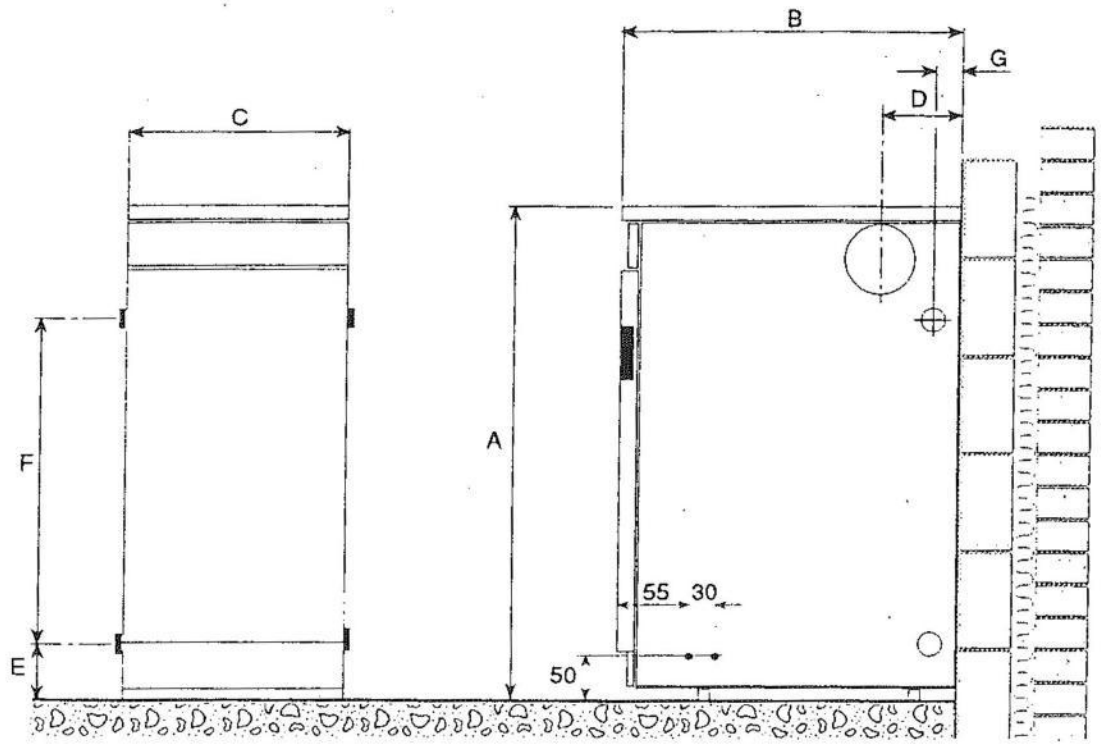
OFTEC is the Oil Fired Technical Association for the Petroleum Industry:

Century House
100 High Street
Barnstead
Surrey
SM7 2NN

Tel: 01 737 37331

SECTION TWO - TECHNICAL INFORMATION
MERLIN BOILERS

2.1 BOILER DIMENSIONS



MODEL		45/65	65/95	100/150	150/185
Output	kW	13.2/19	19/27.8	29.3/44	44/54.2
	Btu/h	45,000/65,000	65,000/95,000	100,000/150,000	150,000/185,000
Height A	mm	855	855	1,035	1,035
Depth B	mm	538	578	693	693
Width C	mm	380	470	520	520
D	mm	124	124	134	134
E	mm	100	100	100	100
F	mm	545	545	675	675
G	mm	70	70	70	70
Tapping H		1" BSP	1" BSP	1 1/4" BSP	1 1/4" BSP
Weight Empty	Kgs	100	130	175	189
Water Contents	Litres	21	24	45	50
Balanced Flue Size		3"	3"	4"	4"
Conventional Flue Offtake Size		4"	4"	4"	4"

SECTION TWO - TECHNICAL INFORMATION
MERLIN BOILERS

2.2 SUITABILITY AND SPECIFICATION

SUITABILITY

For use only with INDIRECT Hot Water/Central Heating Systems.

TYPES OF SYSTEM

Fully Pumped Central Heating and Hot Water.

Pumped Central Heating only.

Pumped Central Heating with Natural Circulation to Cylinder.

* Pumped Sealed Systems.

* Systems with Unvented Hot Water Cylinder.

* Manual reset temperature limiter must be fitted to the boiler.

OPERATING TEMPERATURE

Maximum 85° C

Minimum 60°C

OPERATING PRESSURE

Maximum 2.76 Bar (90 Feet Head H2O).

WATER RESISTANCE

300mm H2O with 11°C temperature rise.

CONVENTIONAL FLUE SIZE

4" Diameter

OIL SUPPLY ENTRY

Near floor at front of both side casing panels.

ELECTRICAL SUPPLY ENTRY

Near floor at front of both side casing panels.

Additionally a knockout is provided in one of the flue entry cover plates for high level entry Left, Right or Rear.

2.3 ELECTRICAL SUPPLY

240v., 1 Ph., 50Hz. Switched by a double pole isolating switch fused 5 AMP.

Wiring must comply with current I.E.E. regulations and the appliance effectively earthed.

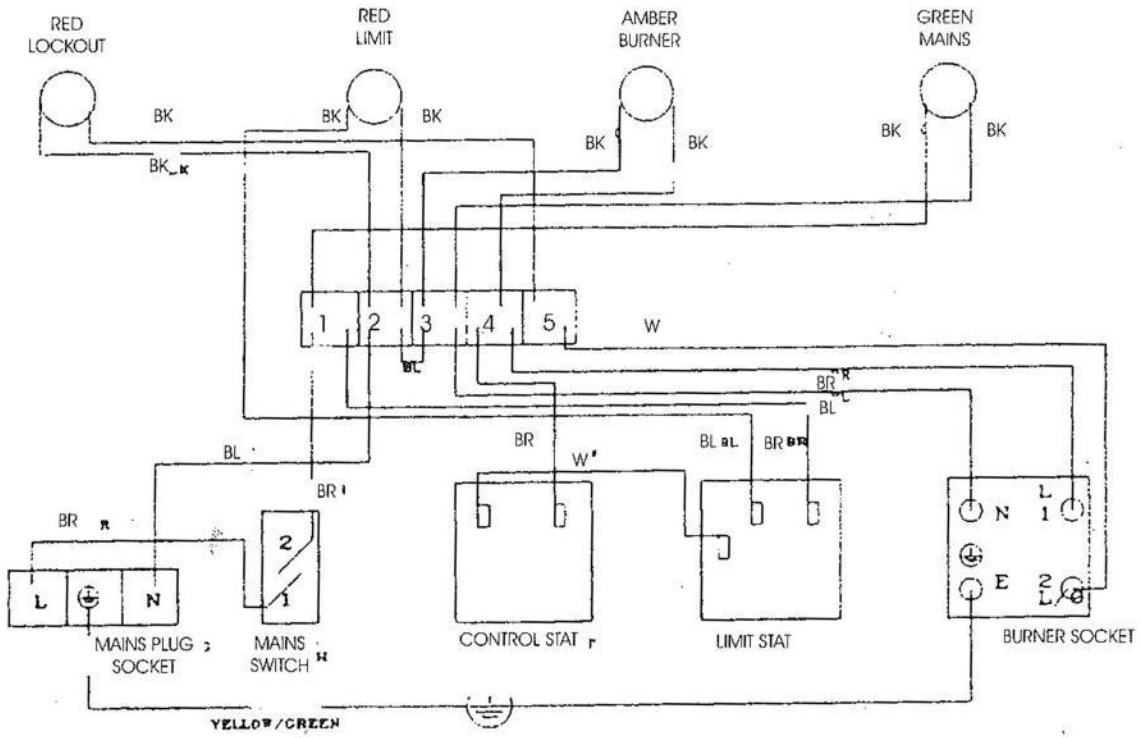
TECHNICAL INFORMATION
MERLIN BOILERS WITH STERLING BURNERS

2.4 BURNER - SETTINGS AND DATA
2.4.1 – FOR 28 SECONDS VISCOSITY – CLASS C KEROSENE

Merlin Model	OUTPUT		NOZZLE	OIL PRESSURE		Firing Rate l/h	Air Setting No (approx)	CO^2	Smoke No.	Flue Gas Rise Above Ambient °C	Blast Tube
	Btu/h 1x1000	kW	Danfoss US/GPH	P.S.I.	BAR						
45/65 Sterling 40	50	14.6	.50/80°EH	100	6.9	1.75	5	11	0-1	165	Fixed Type PL10-5-16-8
	60	17.6	.60/80°EH	100	6.9	2.10	8	12	0-1	175	
	70	20.5	.60/80°EH	120	8.3	2.45	13	12	0-1	185	
65/95 Sterling 40	70	20.5	.60/80°EH	120	8.3	2.45	6	12	0-1	185	Fixed Type PL6-7-19-10
	80	23.4	.75/80°EH	110	7.6	2.80	9	12	0-1	195	
	95	27.8	.75/80°EH	140	9.7	3.24	14	12	0-1	205	
100/150 Sterling 50	100	29.3	1.00/60°ES	100	6.9	3.41	10	11	0-1	175	Fixed Type 'E'
	120	35.2	1.10/60°ES	110	7.6	4.09	12	12	0-1	185	
	140	41.0	1.10/60°ES	140	9.7	4.72	14	12	0-1	195	
	150	44.0	1.25/60°ES	130	9.0	5.11	16	12	0-1	210	
150/185 Sterling 90											Type 'C' Adjustable
	150	44.0	1.25/60°S	120	8.3	5.11	8	11.5	0-1	180	8
	160	46.9	1.25/60°S	130	9.0	5.40	10	12	0-1	190	8
	170	49.8	1.65/60°S	100	6.9	5.80	8	12	0-1	200	15
	185	54.2	1.65/60°S	120	8.3	6.26	10	12	0-1	210	15

2.5 CONTROL PANEL WIRING DIAGRAM

KEY: BK = BLACK BL = BLUE W = WHITE BR = BROWN



2.6 CONNECTING CONTROL PANEL

The Boiler is despatched from the factory with the Control Panel fitted. The phials of the two thermostats are inserted vertically in the pockets situated on either side on the top of the Boiler heat exchanger.

2.7 ELECTRICAL CABLE ENTRY

The mains electricity supply, preferably from a spur switched and fused 5 amp. can enter the Boiler casing at low level at either side near the front of the Boiler through a hole provided (with grommets) in the side panels. Alternatively one of the interchangeable flue connection cover plates is provided with a knockout to permit mains supply entry at high level on either side or back of the casing.

A plug is provided for connection to the mains supply. This plug fits into the 3 pin mains socket in the underside of the Control Panel.

The Burner is supplied with a 4 wire cable and plug. The plug fits the Burner supply socket in the underside of the panel.

SECTION TWO - TECHNICAL INFORMATION MERLIN BOILERS

2.8 REGULATIONS AND STANDARDS

BUILDING REGULATIONS

The installation of oil fired boilers is covered by the requirements of the Building Regulations. There are three separate sets of Regulations covering the U.K. Those for England and Wales are made by the Department of the Environment in London. Approved Document J covers heat producing appliances, including oil heating appliances.

The Building Standards (Scotland) Regulations are made by the Scottish Office. Part F of the Technical Standards to the Regulations covers heat producing appliances and fuel storage, including oil heating appliances and storage.

The Building Regulations (Northern Ireland) are made by the Northern Ireland Department of the Environment. Heat producing appliances, including oil heating appliances, are covered by Technical Booklet L. These Regulations are broadly the same as those for England and Wales.

Building Regulations are administered by Local Authorities.

The Isle of Man has its own Building By-laws. In the Channel Islands, Jersey and Guernsey have their own separate Building By-laws.

Building Regulations are statutory instruments and must be complied with. Any deviation from them has to be covered by a waiver issued by the local Building Control Officer. It is important to be aware of the Building Regulations. They are summarised in this book but that does not absolve installers from studying the original documents and ensuring that their work complies with the statutory requirements contained in them.

For Guidance.

The standards to be adhered to when installing a Merlin boiler are listed below:

BS5410 Part 1: 1977 Oil installations up to 45kW.
Part 2: 1978 Oil installations over 45kW.

BS5449 1990 Forced Circulation Hot Water Central Heating Systems for Domestic Use.

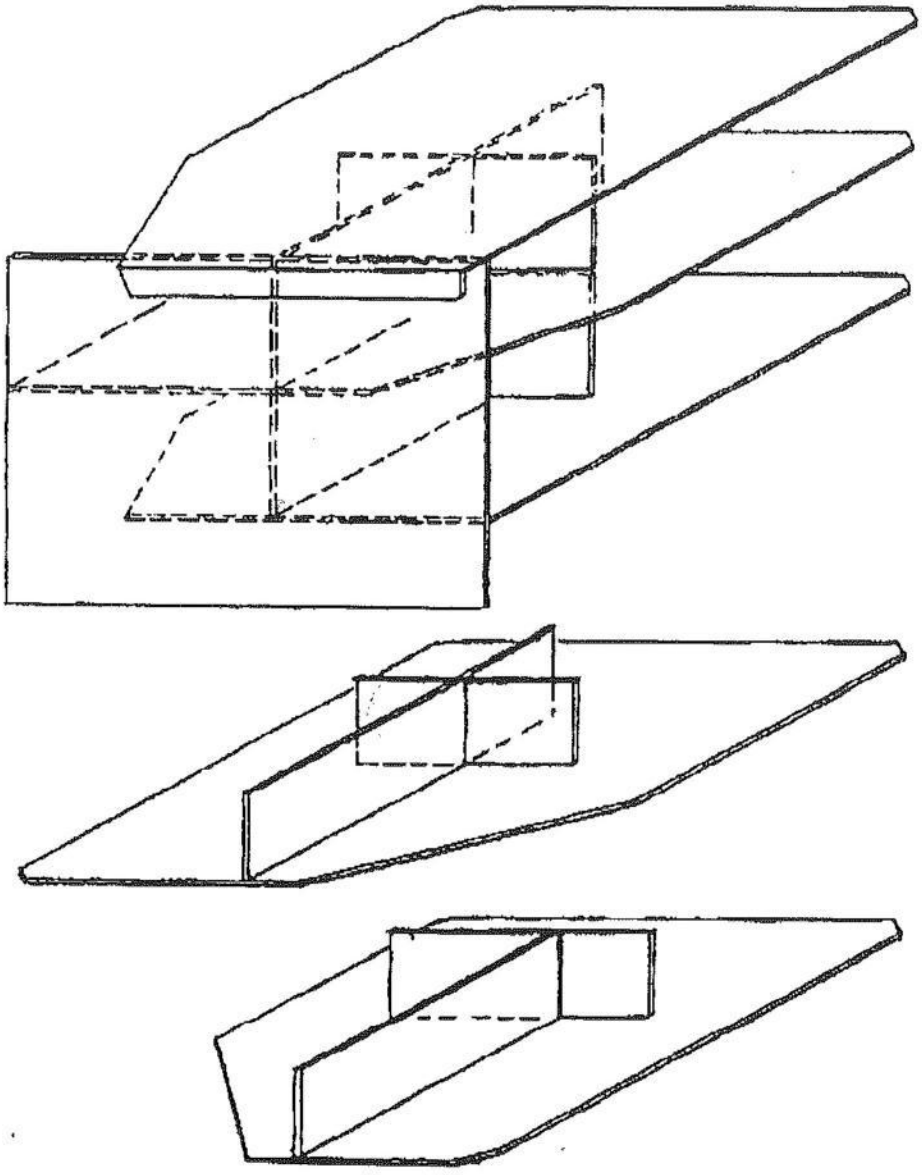
BS4543 Parts 1 & 3: 1976 Factory Made Insulated Chimneys.

BS6461 Part 2: 1984 Installation of Factory Made Insulated Chimneys.

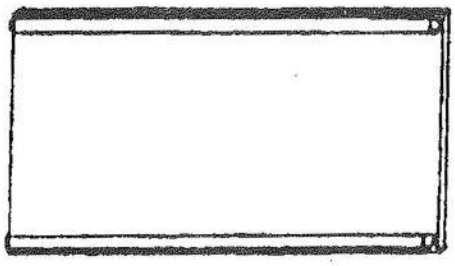
O.F.T.E.C. Published Installation Requirements or recommended Codes of Practice.

SECTION THREE - BAFFLE ARRANGEMENTS

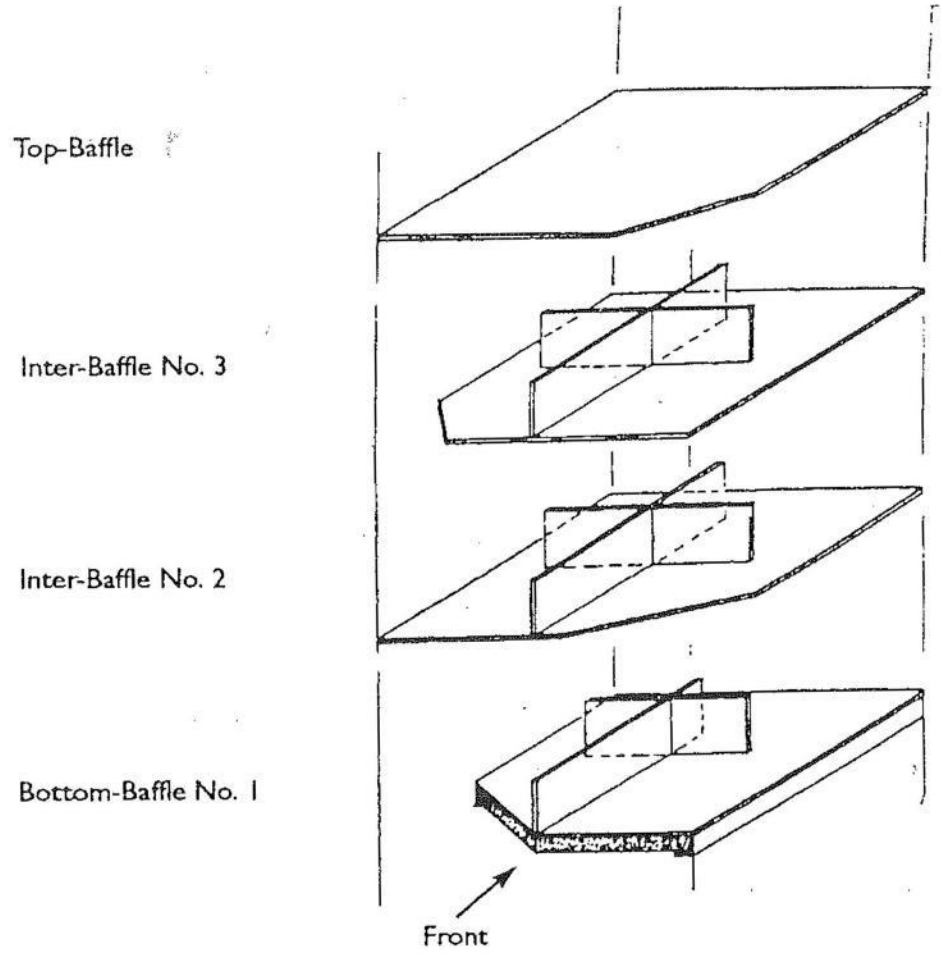
3.1 BAFFLE ASSEMBLY FOR MERLIN 45/65 AND 65/95 BOILERS



3.2 BAFFLE ASSEMBLY FOR MERLIN 100/150 BOILER

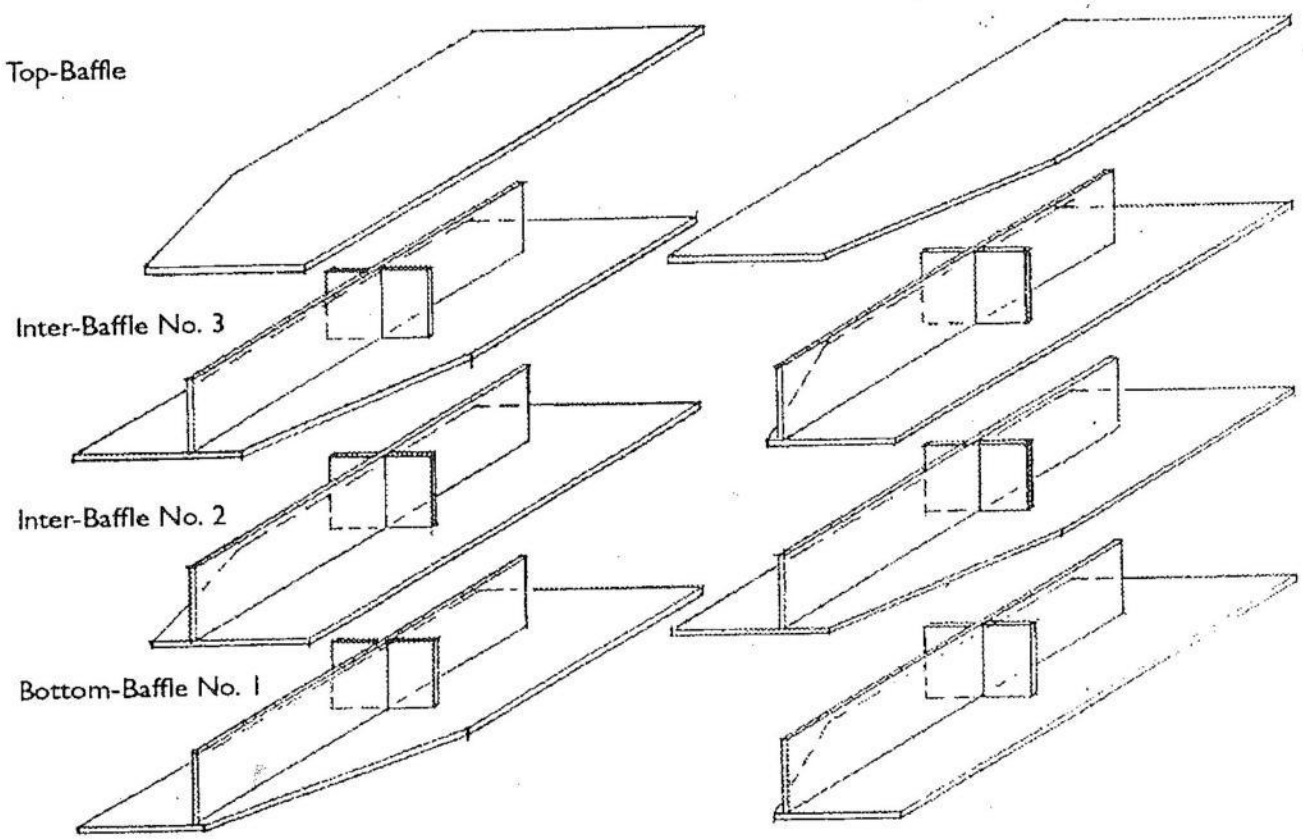


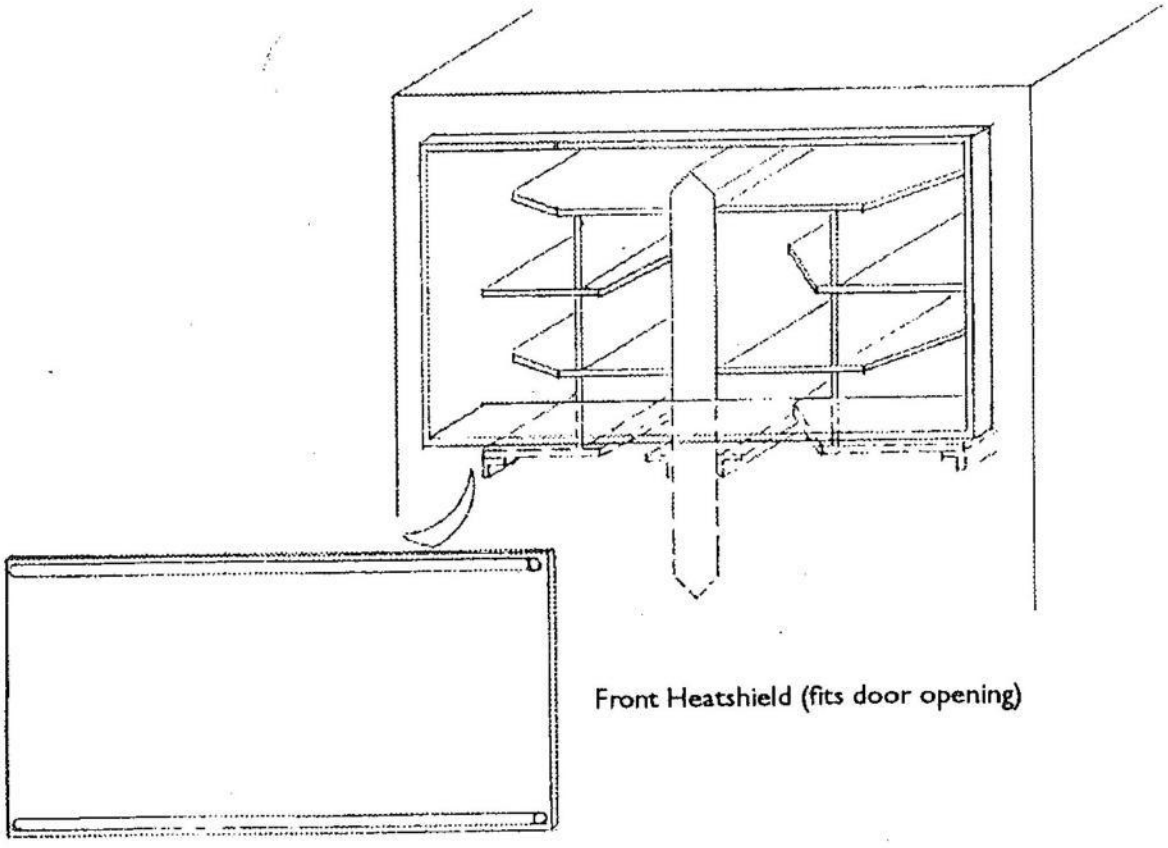
Front Heatshield (fits door opening)



BAFFLE ASSEMBLY MERLIN BOILER 100.150 WATERWAY TOP

3.3 BAFFLE ASSEMBLY FOR MERLIN 150/185 BOILER





Front Heatshield (fits door opening)