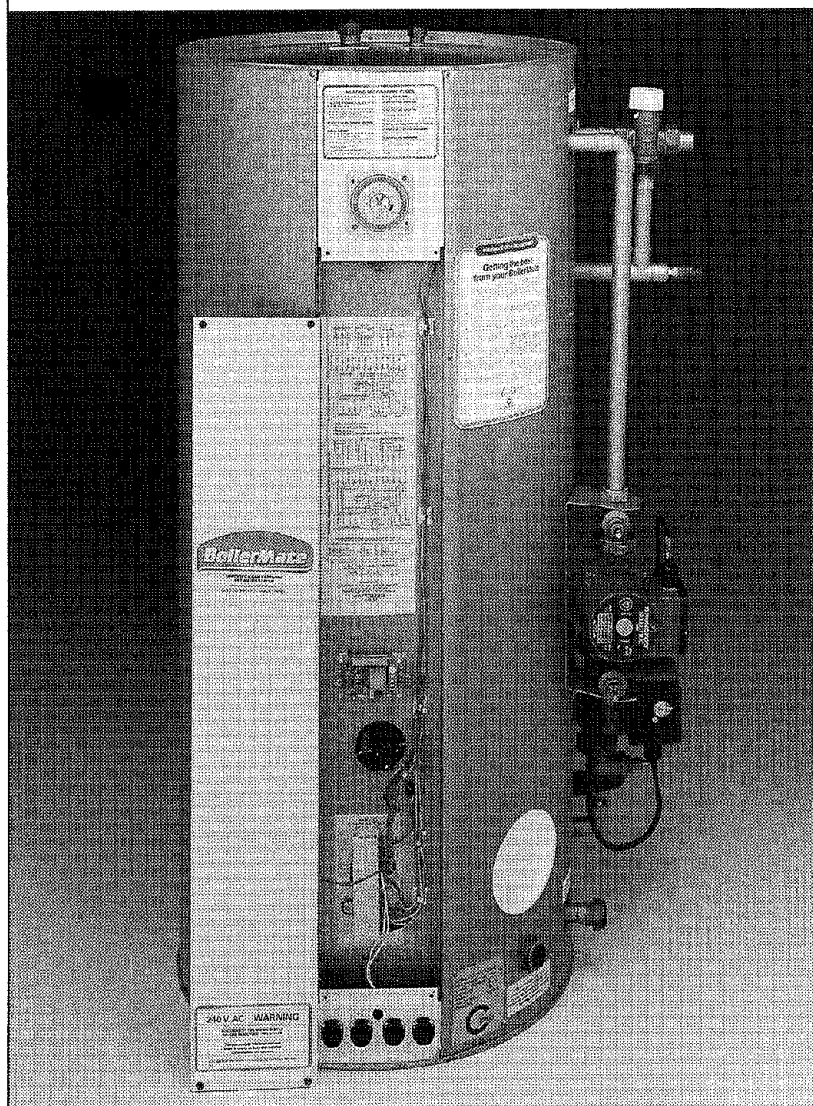


GLEDHILL **BoilerMate**[®]

Central heating and mains pressure
hot water supply system incorporating
a thermal store.

BoilerMate model TS 120 illustrated



BoilerMate is developed in conjunction with British Gas plc.

CIRCULAR PATTERN

| | |
|--------|--------|
| FE 120 | TS 120 |
| FE 140 | TS 140 |
| FE 160 | TS 160 |
| FE 180 | TS 180 |
| FE 200 | TS 200 |

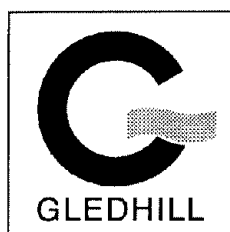
RECTANGULAR PATTERN

FE 115
FE125

FE Model - thermal store complete
with factory-fitted integral feed and
expansion tank.

TS Model - thermal store supplied
for connection to a remote feed
and expansion tank which requires
plumbing on site.

**PLEASE LEAVE THESE
INSTRUCTIONS ADJACENT TO
THE APPLIANCE.**



Design and Installation Instructions

GLEDHILL BOILERMATE SPECIFICATION

| | |
|----------------------------------|----------------------|
| DESCRIPTION | PAGES 2 - 3 |
| SYSTEM DESIGN | PAGES 4 - 7 |
| INSTALLATION | PAGES 8 - 12 |
| COMMISSIONING | PAGES 13 - 21 |
| SERVICING | PAGES 22- 24 |
| APPENDIX | PAGE 25 |
| SALE & WARRANTY TERMS | PAGE 26 |

These instructions should be read in conjunction with the installation/servicing instructions issued by the manufacturer of the heat source being used.

Any installation must be in accordance with the relevant requirements of the gas safety regulations, local building regulations, I.E.E. wiring regulations and byelaws of the local water undertaking. It should be read in accordance with the relevant recommendations of the following:

BS 5376:2; BS 5449:1; BS 5546;
BS 5440:1; BS 5440:2, CP 331:3
and BS 6700.

It must be installed by a competent person as stated in the Gas Safety Regulations.

Manufacturer's notes must NOT be taken as over-riding statutory obligations.

BoilerMate is not covered by section G.3 of the 1985 Building Regulations and is therefore not notifiable to the Building Control Office.

Although the secondary supply (domestic) is at mains pressure, it is not necessary to fit an expansion chamber, pressure or temperature relief valve. BoilerMate is only suitable for use with a vented primary system.

This information is provided to assist generally in the selection of equipment.

Responsibility for selection and specification of our equipment must however remain that of our customer and any experts or consultants concerned with the installation (s).

PLEASE NOTE:

THAT WE DO NOT THEREFORE ACCEPT ANY RESPONSIBILITY FOR MATTERS OF DESIGN SELECTION OR SPECIFICATION, FOR THE EFFECTIVENESS OF AN INSTALLATION OR UNIT CONTAINING ONE OF OUR PRODUCTS.

All goods are sold subject to our conditions of sale which are set out in the Appendix to this specification.

**A UK- WFBS LISTED PRODUCT
DEVELOPED IN CONJUNCTION WITH
BRITISH GAS PLC
GAS COUNCIL NO. 89-317-01**

**BRITISH PATENT NOS. 1358166, 2136099
BRITISH PATENT APPLICATIONS
PUBLISHED UNDER
NOS. 2136099, 2153503, 2153504, 8516025**

DESCRIPTION

INTRODUCTION

The BoilerMate is used to provide improved hot water and space heating as well as a mains pressure hot water supply system for use with any boiler sited remotely. A report by the Cranfield Institute of Technology found that heat storage systems give a potential for energy savings of between 5% and 15%. A boiler of any output **up to a maximum of 80,000 BTU** can be linked to any suitable model of BoilerMate and the deciding factor is the hot water requirement (see Model Selection Data, page 10).

The principle of BoilerMate is to separate the heat generator (e.g. the boiler) from heat emitters by a thermal store, which evens out the fluctuating demands for heating and hot water. Thus by storing energy produced when demand is low and discharging it when demand is high (ie during warm-up or when hot water is drawn off) a smaller boiler can be used. An important feature of this design is that hot water can be supplied directly from the mains at conventional flow rates without the need for temperature and pressure safety relief valves or expansion vessels, at mains pressures of between 1 and 5 bar.

THERMAL STORE

The thermal store contains primary water which is maintained at a temperature of between 80°C and 82°C at the top of the store. It is efficiently insulated with rockwool insulation in a galvanised steel case to minimise standing losses.

DOMESTIC HOT WATER

COLD SUPPLY

BoilerMate models are designed to be fed directly from mains. They fulfil the requirements of Water Byelaw 91, and therefore do **not require a check valve** to be fitted to the supply pipe. The performance of the BoilerMate is directly related to the adequacy of the cold supply to the dwelling. This must be capable of providing for those services which could be required simultaneously and the maximum demand should be calculated. BoilerMate will operate at pressures as low as 1 bar which must be available when local demand is at its maximum, but the preferred range is between 2 and 5 bar. Between 1 and 2 bar simultaneous demand capability will be affected and a low resistance model (140, 180 or 200) should be specified. As a general guideline, although a 15mm copper supply is sufficient for the smaller, one bathroom dwelling, **a 22mm main (25mm MDPE) should be the minimum for larger dwellings (communication and supply pipes).**

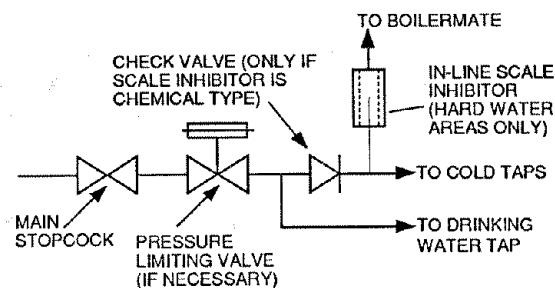
If a water meter is fitted in the service pipe, it should have a nominal rating to match the anticipated maximum simultaneous hot and cold

water demand, calculated in accordance with BS 6700. This could be 50 litres per minute in some properties.

If the incoming static mains water pressure exceeds 5 bar at any point in the 24 hour cycle (this usually means no greater than 4 bar measured during the daytime) then a pressure limiting valve set at 3.5 bar should be fitted downstream of the stop tap where the cold supply enters the property. Units must be fitted strictly in accordance with the requirements of the local water undertaking who should be consulted prior to installation. In the event of any difficulty please contact us as the manufacturer.

Equipment used in the system should be suitable for a working pressure of 10 bar.

Figure 2
Cold Feed Arrangements



BoilerMate is WBS listed.

A non-return valve is **NOT** required. Should ancillary equipment fitted in the supply to the BoilerMate require a non-return valve then this valve must be fitted directly after the branch to the drinking water tap (kitchen sink) and **NEVER** in the final branch to the BoilerMate.

SAFETY FITTINGS

It is not necessary to fit the control and safety equipment normally associated with mains pressure supply since the unit contains its own patented expansion chamber which is sealed for life.

DOMESTIC FLOW RATE

Provided that pipe sizing is adequate the hot flow at the tap is determined by the local mains pressure but should be up to 18 litres/min on the Models 115, 120 and 160 and up to 35 litres/min on the Models 125, 140, 180 and 200 according to the temperature set by the user and the amount of cold water blended in.

EXTERNAL EXPANSION VESSEL

This is not necessary with BoilerMate.

USE IN HARD WATER

The patented design of the heat exchange module is such that the turbulence through the coil slows down the formation of scale in even the

hardest water conditions, at normal operating pressures. Where the water can be considered hard, it is recommended that an effective proprietary in-line scale inhibitor is installed. Phosphate dosing scale inhibitors of the proportional dosing pattern are recommended because major manufacturers will guarantee their effectiveness. Other types can be used with our equipment provided that the manufacturer concerned will also give assurance on scale prevention.

It is important that where the supply to the BoilerMate is in 22mm the in-line descaler is also 22mm.

The installation of the scale inhibitor should be installed in accordance with the manufacturer's instructions and with the Water Byelaws.

The advice of a specialist Water Treatment Company should be sought if in doubt.

HOT WATER CAPABILITY

Models 115 & 120: The normal capability is for a bath with a second bath after 30 mins.

Models 125 & 140: The hot water capability is the same as for the 120 but the flow rate will be nearly double for a given pressure.

Model 160: This model has the same bath capability as the model 120 but with extra reserve for ancillary requirements between baths.

Model 180: The hot water capability is the same as the 160 but the flow rate will be nearly double for a given pressure.

Model 200: The top of the range 200 is capable of supplying two baths simultaneously with two further baths 30 mins later.

These hot water loads can be met whilst still meeting a demand from the central heating.

The 140, 180 and 200 models circular and the 125 model rectangular have low resistance secondary heat exchangers and should be specified where mains pressures are low or may be reduced.

TAPS & VALVES

Hot and cold taps and mixing valves used with the unit must be suitable for operating at 10 bar.

Aerated taps are recommended to prevent splashing.

PIPE SIZING

To achieve good distribution of the available supply, it is particularly important in any mains pressure system that piping in the dwelling should be sized in accordance with BS 6700. The rule of thumb guideline following in this paragraph should be adequate for most domestic situations.

- 1 Although a 15mm copper supply is sufficient for the smaller 1 bathroom dwelling a 22mm (25mm MDPE) supply should be the minimum for larger dwellings.

- 2 The cold feed should be run in 22mm copper to the BoilerMate. The hot draw-off should also be in 22mm as far as the branch to the bath tap.
- 3 The tee-offs to basins/sinks should be in 10mm; the tee-offs to the bath and showers should be in 15mm.
- 4 Tee-offs to taps in existing property which are in 15mm **should be restricted** to balance flow to each outlet.
- 5 Best results are achieved by fitting appropriate flow regulators to each hot and cold outlet.
- 6 **Any surface pipework in the BoilerMate cupboard should be insulated to reduce standing losses and cupboard temperatures**

SHOWERS

Either thermostatic or manual showers and mixer valves can be used as long as both hot and cold are mains fed. The hot water supply to a shower mixing valve should be fed directly from the BoilerMate and preferably should be the first draw-off point on the hot circuit. The cold supply to a shower mixing valve should be fed directly from the rising main and should be the first draw-off point on the cold circuit or ideally be an independent feed.

Showers - Fixed Head Type:

No anti-syphonage arrangements are necessary.

Showers - Loose or Flexible Head Type:

If a loose head shower with flexible hose is to be used over a bath, the hose must be fixed so that the head cannot fall closer than 25mm (as specified in Byelaw 16 of the 1987 Model Water Byelaws) above the top edge of the bath in order that the head is prevented from being immersed in bath water, or the shower must incorporate or be fitted with an anti-syphonage device at point of flexible hose connection.

BIDETS

The supply of hot and cold mains water direct to bidet is permitted provided that this bidet is of the over-rim flushing type and that a type 'A' air gap is incorporated. It must not include either an ascending spray or provision to attach a hand spray.

SYSTEM DESIGN

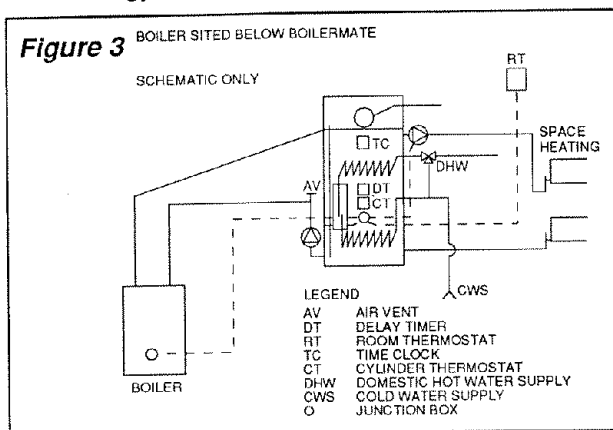
METHOD OF SIZING

The efficiency of this system is such that special design criteria apply: it is only necessary to calculate the design heat loss by reference to either the CIBSE Guide or British Standard 5449 and add 10% to decide on boiler size. **If rapid recovery of hot water is required, then the boiler size may be increased accordingly.**

HEAT SOURCE -SYSTEM DESIGN

BOILER SITED BELOW BOILERMATE

Any boiler can be used when the flow and return to the BoilerMate rise continuously without valves. The size of the flow and return pipes from the boiler should be determined by normal methods but must be a minimum of 22mm. No part of the flow should contain a valve, as this forms the open vent should the boiler thermostat fail. The recommended control system to give the most energy efficient operation is shown in FIG.3



This is supplied as a factory fitted and pre-wired package consisting of:

- a pump between boiler and thermal store
- b pump for radiator circuit
- c cylinder thermostat
- d timer
- e junction box
- f thermostatic mixing valve
- g boiler pump delay timer

SYSTEMS WITH DIPPED FLOW & RETURN AND BOILERS WITH OVERHEAT THERMOSTAT

If the flow and return between the boiler and the thermal store (BoilerMate) are dipped **the boiler should be suitable for sealed systems**, ie FITTED with a second overhear thermostat. In these circumstances manual air vents should be fitted as in FIG. 4 and particular attention paid to the boiler manufacturer's recommendations with respect to the minimum static head requirement. The water level line is 165mm below the top of the unit in the FE120 and FE140 models, and 180mm in all other FE models.

Figure 4

SYSTEMS WITH DIPPED FLOW AND RETURN AND BOILERS WITH OVERHEAT THERMOSTAT
SCHEMATIC ONLY

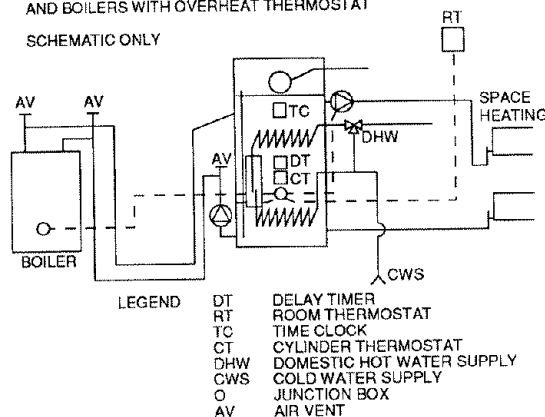
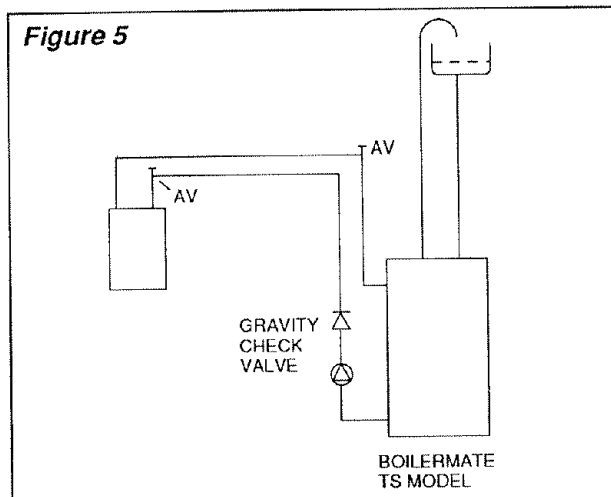


Figure 5 shows an alternative layout using T.S. model.

Figure 5



If the boiler is higher than the BoilerMate (as in figure 5) a gravity check is necessary as shown to prevent gravity circulation from the BoilerMate to the boiler during dormant periods.

SYSTEMS WITH DIPPED FLOW & RETURN AND BOILERS WITHOUT OVERHEAT THERMOSTAT

Where a boiler of a type which does not have an overhear thermostat is fitted so that the flow and return between the boiler and the thermal store are dipped, special criteria apply.

In order to comply with British Standards, the expansion pipe must rise continuously from the boiler.

See figure 6 overleaf.

Figure 6

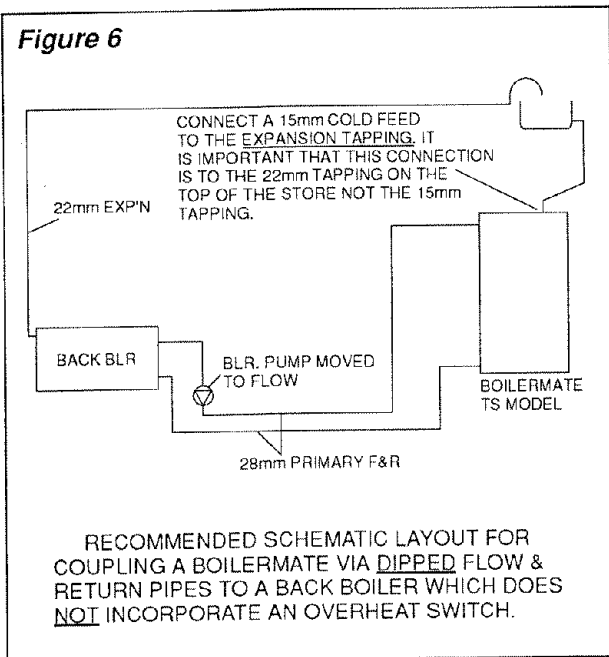


Figure 6 illustrates a method of coupling a back boiler without an overheat switch to a T.S. BoilerMate in a situation with limited headroom. (eg in a flat). The cold feed is connected to the expansion tapping, and the expansion pipe is run directly from the boiler.

The pump is moved to the boiler flow to avoid pumping over. The flow and return pipes are increased to 28mm to minimise the pressure reduction of the boiler when the pump is running.

If an electric immersion heater is fitted into a BoilerMate plumbed in this way it should be of a type fitted with a thermal cut-out (eg. Redring model 30/302201). The cold feed tapping should be plugged. In these circumstances, the open vent from the boiler to the feed and expansion tank should be a minimum of 22mm dia copper tube or equivalent and should rise continuously from the boiler to discharge above the feed and expansion cistern. The feed pipe should not be less than 15mm copper tube or equivalent.

GENERAL NOTES FOR GUIDANCE ON SYSTEM DESIGN

Radiators should **not** be fitted across the circulating pipes between the boiler and the BoilerMate.

The radiator circuit in FIG. 3 is controlled by the heating circuit pump through the action of room thermostat and time clock.

For fuel economy and best boiler performance, the system should be designed so that gravity circulation does not take place in the heating system when the pump is not running. It is often necessary to fit a check valve to be certain of preventing this.

If the boiler is fitted at a higher level than the

BoilerMate, it may be necessary to fit a gravity check valve on the primary circuit to prevent reverse circulation during dormant periods.

FE units come complete with their own feed and expansion tanks. the water level in this tank should be at least 250mm above the highest point on the radiator circuit.

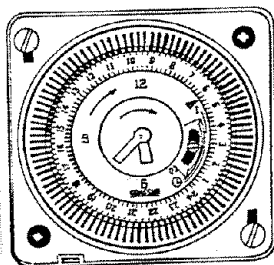
TS units need a remote F&E tank which should not be more than 6m above the thermal store base.

A by-pass is **not** needed in the circuit between boiler and thermal store as the latter performs this function. It may be necessary, however, to fit one on the heating circuit if TRV's are fitted on all radiators.

SYSTEM DESIGN

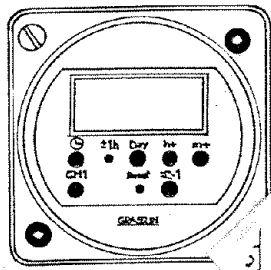
CONTROLS

Figure 7a



Electro-Mechanical clock

Figure 7b

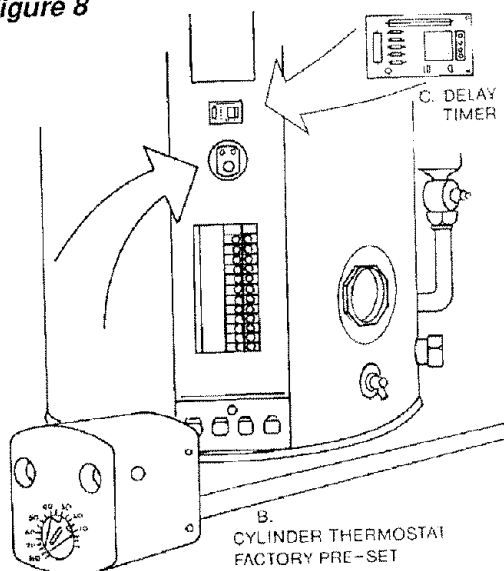


Digital Clock

PACKAGE CONTROL SYSTEM

BoilerMate is supplied as standard with an electro-mechanical clock to control the space heating (see Fig. 7a). A seven day digital clock is available as an alternative (see fig. 7b). The clock/programmer, together with a room thermostat, if fitted, controls the heating system pump. A kit is available to site the clock/programmer remote from the BoilerMate if required (page 24). The boiler is controlled by the cylinder thermostat.

Figure 8



CYLINDER THERMOSTAT

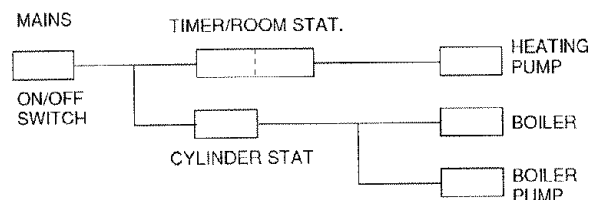
The cylinder thermostat is the principal control mechanism and the correct type is therefore important. This will be supplied and pre-set as part of the control package.

DELAY TIMER

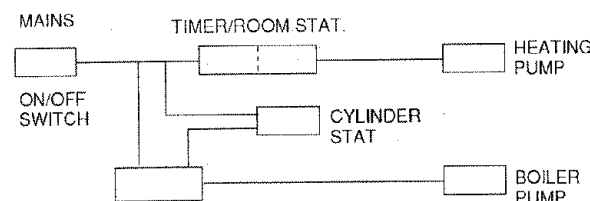
A delay timer is pre-wired into the BoilerMate wiring loom. **Link 1 must be removed for boilers which have pump over-run.**

Figure 9

PACKAGE CONTROL SYSTEM



BOILERS NOT REQUIRING PUMP OVER-RUN



BOILERS REQUIRING PUMP OVER-RUN

The delay timer is activated on boilers without pump over-run by the link between 4 and 8. This aids system economy by removing all the hot water from the boiler each time it shuts down.

ELECTRICAL IMMERSION HEATER

If an electric immersion heater is fitted it must:

- be set to operate at 80°C
- be wired to its own power source by a 13amp fuse and **not through the cylinder terminal block or time clock** which should be protected with a 3A fuse.

A METHOD OF COUPLING GAS & SOLID FUEL BOILERS TO BOILERMATE

Many of your customers would like their solid fuel open fire or boiler to make a useful contribution to their automatic gas-fired central heating system.

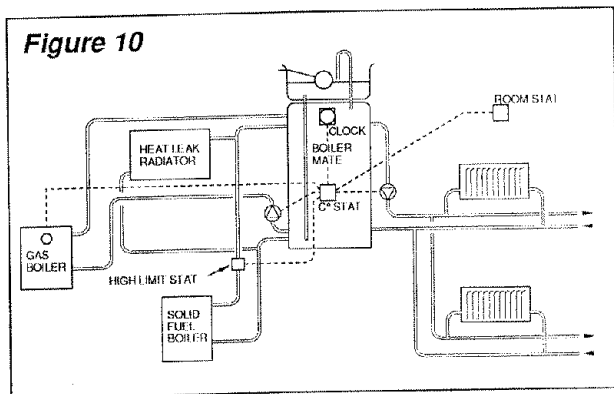
Until now, this has required a whole array of controls, and installers have been deterred, either by the cost, or the complexity, or both. Where BoilerMate is used as the heart of the system there is no problem. BoilerMate is the neutral point of the installation and can therefore accept heat from more than one source without upsetting the other. The heat from the secondary source can be fed to the BoilerMate either by gravity or pumped circulation.

If it is required to use heat from a solid fuel boiler then this must be piped in conjunction with a

gas (or other automatic) boiler, so as to ensure that the store will be maintained at full temperature.

The diagram is a suggested method of doing this.

The high limit thermostat on the solid fuel boiler flow pipe should be wired across BoilerMate terminals 4 and 10. It should close on temperature rise, and be set to (say) 90°C. This will then switch on the heating pump, thus dispersing the excess heat into the radiators;.



To order BoilerMate for dual boiler use specify model "ET". Price and delivery will be confirmed by our Technical Sales Office.

INSTALLATION

INSTALLATION INSTRUCTIONS

NOTE:

1. INSTALLERS ARE ADVISED THAT COMBINED FEED AND VENT PIPES MUST NOT BE USED IN BOILERMATE INSTALLATIONS;

2. IT IS RECOMMENDED THAT SURFACE PIPEWORK IN THE BOILERMATE CUPBOARD BE INSULATED TO REDUCE STANDING LOSSES AND TO PREVENT UNNECESSARILY HIGH CUPBOARD TEMPERATURES. MORE HEAT IS LOST FROM THE FIRST METRE OF PIPEWORK THAN FROM THE STORE.

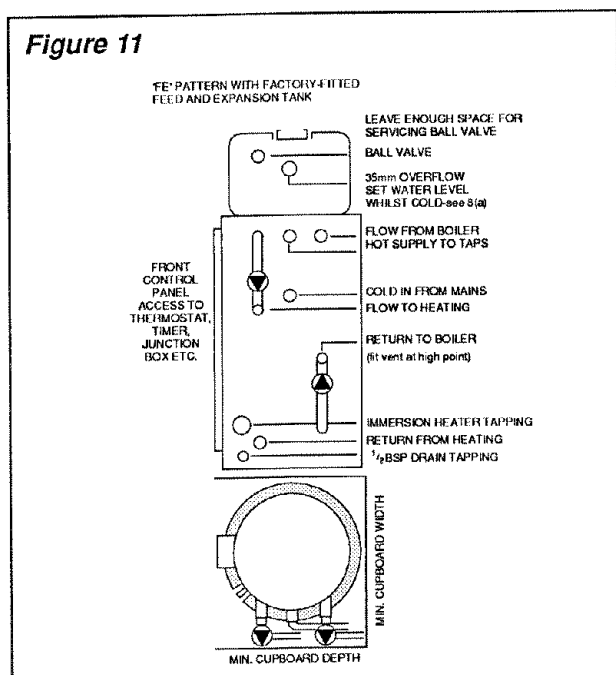
3. NOT WITHSTANDING THE ABOVE, CUPBOARD TEMPERATURES ARE NORMALLY HIGHER THAN IN A CONVENTIONAL SYSTEM AND THE DESIGN OF BOTH THE CUPBOARD AND THE DOOR SHOULD TAKE THIS INTO ACCOUNT.

PLUMBING CONNECTIONS

Make all water connections in accordance with the labelling on the thermal store and associated pipework. If the incoming mains pressure exceeds 5 bar at any point in the 24 hour cycle, (this usually means no greater than 4 bar during the daytime) then a pressure limiting valve, set at 3.5 bar should be fitted downstream of the stop tap where the cold supply enters the property. See page 2 under Domestic Hot Water. If a TS model is used with a boiler fitted above the thermal store, a check valve should be incorporated in the connecting pipework leading from the BoilerMate to the boiler, ie the boiler return as shown.

* All factory made joints should be checked after installation in case they have loosened during transit.

Figure 11

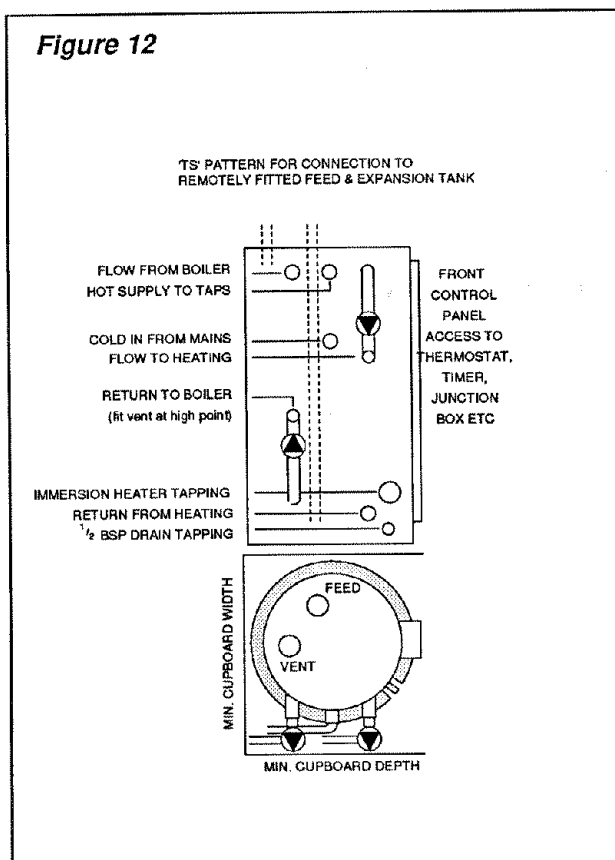


NB: The water connections on a BoilerMate are reversed when compared with a conventional system, ie the heating flow and return are taken directly from the thermal store and the domestic water is taken to and from the coil.

FE MODELS - COMBINED FEED & EXPANSION TANK

- It is most important to adjust the fitted ball valves whilst the system is cold to give a water level of 50mm above the feed outlet to the primary system to allow adequate room for expansion (this is marked by a corrugation in the wall of the tank).
- Sufficient space should be left above the unit to allow access to the ball valve for servicing and adjustment.
- A 1.1/4" female tapping is supplied as standard in the feed and expansion tank, in Scotland a 35mm overflow is required but in England if the mains supply pressure is below 4 bars a 22mm warning pipe is adequate. This should be fitted to discharge clear of the building and be situated so that any overflow can be easily observed.

Figure 12



When the feed and expansion tank is remotely fitted it must be large enough to accommodate the expansion from the primary capacity which includes the thermal store.

All TS model BoilerMate are for vented primary systems only. A sealed system primary unit is not available.

PRIMARY TEMPERATURE

The system operates on the normal primary flow temperature of 80°C and any traditional hot water radiator or convector can be used with the system.

DOMESTIC WATER TEMPERATURE

A Brawa-Mix valve is fitted for the control of domestic hot water by the user.

The dhw flow rates shown on the following pages are for water raised through 35°C.

To increase or decrease the temperature rotate the valve head as shown in Fig 13.

BOILER THERMOSTAT SETTING

This should always be set to maximum to give the best hot water service and to achieve the highest efficiency by reducing boiler cycling.

RANGE RATED APPLIANCES

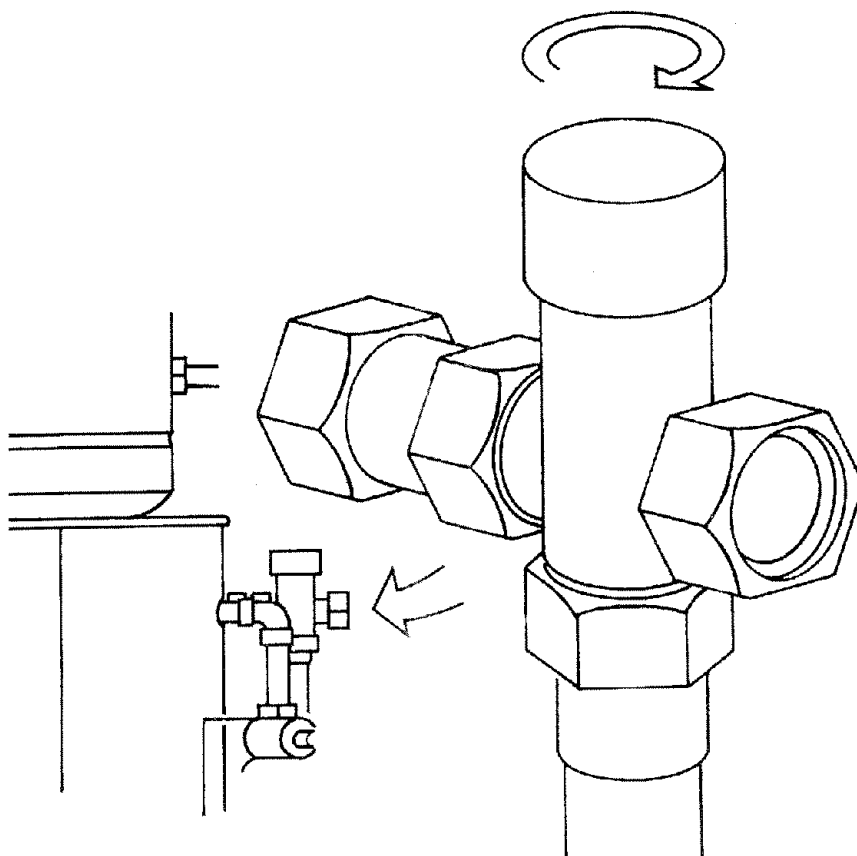
Where a range rated boiler is used it should always be set at the **highest** output. System efficiency will not be impaired, while the recovery rate is improved.

PUMP SETTINGS

The pumps in the control package must be set in the following way:

- a the pump (lower) between boiler and BoilerMate should be set to as high a level as possible consistent with low noise levels so that the temperature difference across the boiler is 6°C or less.
- b the pump on the heating circuit must be set by the installer to give a temperature difference across the radiator circuit of 11°C in the usual way.

Figure 13



INSTALLATION

GUIDE TO MODEL SELECTION DATA - CIRCULAR PATTERNS

| MODEL | STORE CAPAC APPROX | HOT WATER FLOW RATE | DIMENSIONS OF THERMAL STORE OVER INSULATION | MINIMUM CUPBOARD SIZE | TAPPINGS | SUGGESTED DWELLING TYPE | MAXIMUM RECOMM. BOILER OUTPUT |
|-------|--------------------|---------------------|---|-----------------------|--|--|-------------------------------|
| | Litres | l/min | height x dia. | width x depth | | | Btu's/000's |
| FE120 | 120 | 18 | 1390 x 490 | 700 x 600 | All connections on the models 120, 140, 160 and 180 are for 22mm pipe unless specified differently at time of order. All connections are for 28mm pipe on the Model 200 unless specified differently at time of order. 21/4 IHB tapping supplied as standard. 1/2 Fem BSP for drain supplied as standard. Units will be supplied with all fittings on the right hand side unless specifically requested handed. | 2/3 bedroom house with one bathroom and/or shower | 40 |
| TS120 | | 18 | 1120 x 490 | 700 x 600 | | | 40 |
| FE140 | 120 | 30 | 1390 x 490 | 700 x 600 | | 2/3 bedroom house with one bathroom and separate en-suite shower room | 40 |
| TS140 | | 30 | 1120 x 490 | 700 x 600 | | | 40 |
| FE160 | 160 | 18 | 1670 x 490 | 700 x 600 | | 2/3 bedroom house with one bathroom and/or shower with additional hot water capacity | 40 |
| TS160 | | 18 | 1375 x 490 | 700 x 600 | | | 40 |
| FE180 | 160 | 30 | 1670 x 490 | 700 x 600 | | 2/3/4 bedroom house with one bathroom and one or two separate en-suite shower rooms | 50 |
| TS180 | | 30 | 1375 x 490 | 700 x 600 | | | 50 |
| FE200 | 200 | 30 | 1670 x 540 | 750 x 600 | | 3/4 bedroom house with two bathrooms and one or two separate en-suite shower rooms | 80 |
| TS200 | | 30 | 1375 x 540 | 750 x 600 | | | 80 |

GUIDE TO MODEL SELECTION DATA - RECTANGULAR PATTERNS

| MODEL | STORE CAPAC APPROX | HOT WATER FLOW RATE | DIMENSIONS OF THERMAL STORE OVER INSULATION | MINIMUM CUPBOARD SIZE | TAPPINGS | SUGGESTED DWELLING TYPE | MAXIMUM RECOMM. BOILER OUTPUT |
|-------|--------------------|---------------------|---|-----------------------|---|--|-------------------------------|
| | Litres | l/min | hxdxw | width x depth | | | Btu's/000's |
| FE115 | 120 | 18 | 1410x545x320 | 550x600 | All connections are for 22mm pipe. 21/4 IHB tapping supplied as standard. 1/2 Fem BSP for drain supplied as standard. Units will be supplied with all fittings on the right hand side unless specifically requested handed. | 2/3 bedroom house with one bathroom and/or shower. | 40 |
| FE125 | 120 | 30 | 1410x545x320 | 550x600 | | 2/3 bedroom house with one bathroom and separate en-suite shower room. | 40 |

NOTES:

- Models 140, 180 and 200 have low resistance, high flow rate heat exchangers. They are particularly suited to areas where the water pressure is lower than normal.
- The flow rates shown are with the Brawa-mix valve set to give 35°C rise and assume normal pressure and an adequate flow to the appliance.
N.B. The flow rates have been checked under factory conditions and on a multiple installation site the installer must check the flow rate availability immediately upon installation and commissioning. There may well be some variations in the flow rates in different parts of the country.
- All models are supplied complete with pre-plumbed and pre-wired control package:

- pump between boiler and thermal store
 - pump for radiator circuit
 - cylinder thermostat
 - Electro Mechanical/Digital Clock to control Heating
 - junction box
 - thermostatic mixing valve
 - boiler pump delay timer
- Models for use with central boiler are available - see our leaflet Code Spec. 21
 - An AV50A kit can be ordered for use with TS Model - (page 4)
 - Thermal store capacities vary slightly according to pattern and type of heat exchanger.
 - Any pattern of Boilermate can be specified 'ET' for use with dual boilers (see page 7).

WIRING THE SYSTEM

Because BoilerMate is pre-wired to a central control panel, plumbers are well able to complete the electrical installation provided they adhere strictly to the IEE Regulations. Do not attempt the electrical work unless you are competent to carry it out to the above standards. The appliance must be earthed **and protected with a 3 amp fuse**. Establish whether the boiler to be used is wired for pump over-run.

DELAY TIMER

A delay timer is pre-wired into the BoilerMate wiring loom. **Link 1 must be removed for boilers which have pump over-run.** The delay timer is activated on boilers without pump over-run by the link between 4 and 8. This aids system economy by removing all the hot water from the boiler each time it shuts down.

TO WIRE THE BOILERMATE

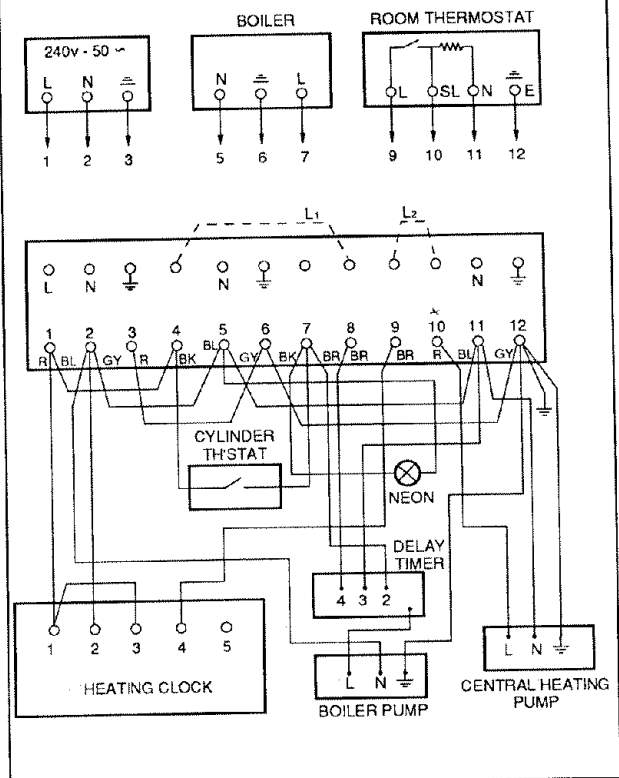
To a Boiler without pump over-run

Before commencing, ensure that the power source to which it is intended to connect the system is isolated.

- 1 Remove white cover plate (4 screws) and connector block cover (pull off).
- 2 From a 3 amp fused and switched connection unit bring a live, neutral and earth to the BoilerMate connector block.
Live to terminal 1
Neutral to terminal 2
Earth to terminal 3
- 3 Leave in link no. 1 joining BoilerMate terminals four and eight.
- 4 Take a live from BoilerMate terminal no. 7 to boiler live.
- 5 Take a neutral from BoilerMate terminal no. 5 to boiler neutral.
- 6 Take an earth from BoilerMate terminal no. 6 to boiler earth.

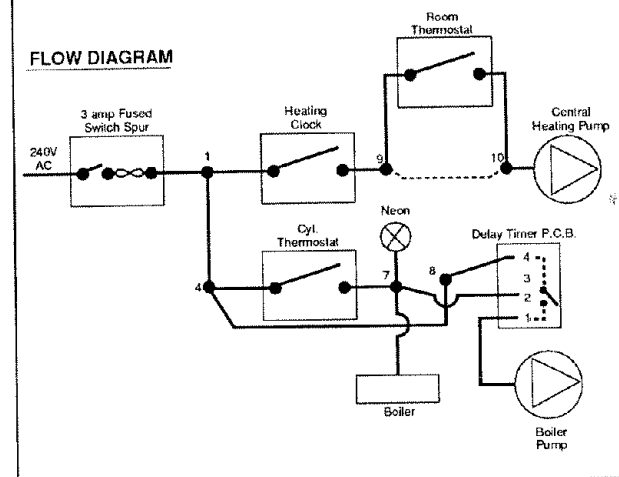
Figure 14

BOILER WITHOUT PUMP OVER-RUN



BOILERMATE SYSTEM WIRING (BOILER WITHOUT PUMP OVER-RUN)

FLOW DIAGRAM



INSTALLATION

TO A BOILER WITH PUMP OVER-RUN

Before commencing, ensure that the power source to which it is intended to connect the system is isolated.

- 1 Remove white cover plate (4 screws) and connector block cover (pull off).
- 2 From a 3 amp fused and switched connection unit bring a live, neutral and earth to the BoilerMate connector block.
Live to terminal 1
Neutral to terminal 2
Earth to terminal 3
- 3 Remove link no. 1 joining BoilerMate terminals 4 and 8.
- 4 From BoilerMate terminal no. 4 take a live to the permanent live connection on boiler.
- 5 From BoilerMate terminal no. 5 take a neutral to the boiler neutral.
- 6 From BoilerMate terminal no. 6 take an earth to boiler earth.
- 7 From boilerMate terminal no. 7 take a live to the boiler switched live connection (SL)
- 8 From the pump live (Lp) connection on boiler bring the live to BoilerMate terminal no. 8.

TO WIRE IN A ROOM THERMOSTAT TO BOILERMATE:

To a Boiler without pump over-run

- 1 Remove link 2 joining BoilerMate terminals 9 and 10.
- 2 From BoilerMate terminal no. 9 take a live to the live connection on room thermostat.
- 3 From room thermostat switched live connection take a live to BoilerMate terminal no. 10.
- 4 Connect BoilerMate terminal no. 11 to room thermostat neutral.
- 5 Connect BoilerMate terminal no. 12 to room thermostat earth.

FROST PROTECTION:

Where frost protection is required for the boiler only, a frost thermostat should be wired across terminals 4 & 7. Where frost protection is required for the whole house, or where a base temperature is required during cold weather, a frost thermostat should be wired across terminals 4 and 9. Ensure that this thermostat is set +1 or +2°C, and the room thermostat set down to the required temperature.

An alternative to fitting a frost thermostat would be to set the programmer to constant during the cold weather period.

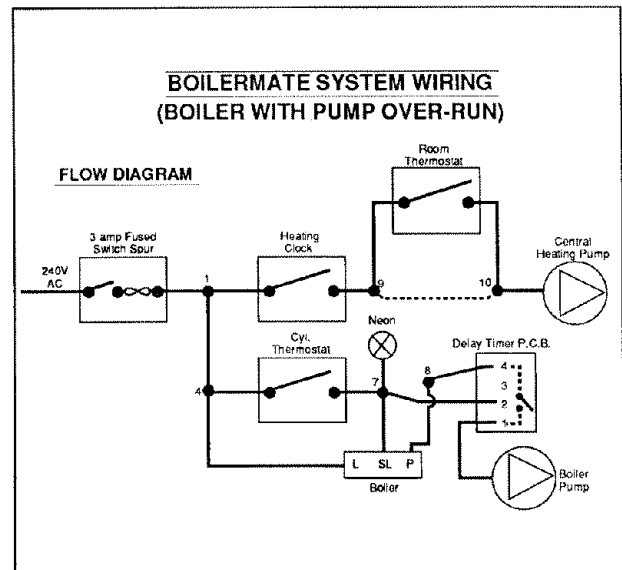
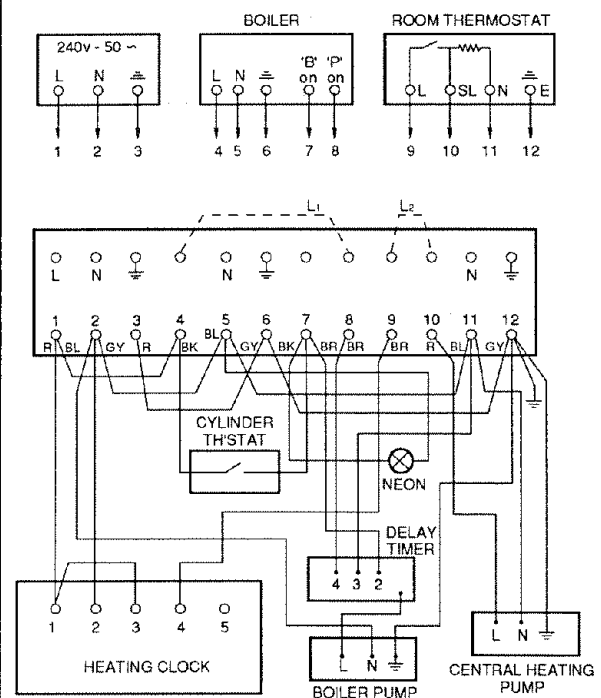


Figure 15 BOILER WITH PUMP OVER-RUN



THIS APPLIANCE MUST BE EARTHED

INTERNAL WIRING COLOUR CODE

R-RED
SUPPLY VOLTAGE 240V~BR-BROWN
SUPPLY FREQUENCY 50 H BL-BLUE
SUPPLY TO BE FUSED 3 amp GY-GREEN/YELLOW
RATING (MAXIMUM) 500 BK-BLACK

**NOTE : WIRING DIAGRAM FOR BOILERMATES
FITTED WITH A 'GRASSLIN' HEATING TIME CLOCK,
IF ANY OTHER CLOCK IS FITTED, CONSULT AN
ELECTRICIAN.**

'B' ON - BOILER ON TERMINAL
'P' ON - PUMP ON TERMINAL
REMOVE LINK L₁
REMOVE LINK L₂ WHEN ROOM THERMOSTAT IS FITTED

COMMISSIONING THE SYSTEM

It is essential that the system functions properly for optimum performance. To achieve this, the system should be commissioned in accordance with good practice and generally in accordance with the requirements of BS:6798 and BS:5449.

FE MODELS - Ensure that the float is correctly adjusted to close the ball valve at the water level line inside the F&E tank

TS MODELS - Ensure that the float is adjusted to give adequate expansion space in the tank, bearing in mind that the primary water content of this system is much greater than other systems. Check when the system is hot that there is no overflow.

NOTE: The commissioning neon should go off when the boiler stops firing if the system is operating correctly. If it does not the likeliest reason is that the boiler flow temperature is too low. See para below*.

Fill the system and flush cold.

During all flushing operations, the pumps should be removed, and replaced with "slave" pumps. The original pumps should only be replaced when the system is clear of all residues and debris.

No pump should ever be switched on before it is vented.

It is good practice to use an appropriate cleaning solvent (such as Sentinel X300) to ensure that residues do not impair the performance of the pumps.

Refill the system and commission the boiler.

If the boiler is range rated, then adjust to the maximum heat input. Set the pump between boiler and BoilerMate (lower mounted pump) to give a high flow rate. A temperature difference across the boiler of say 6°C is near the optimum. In practice, the highest pump setting that does not produce system noise gives the best BoilerMate performance but this should not be above 10°C.

Flush the system hot.

Refill the system

NOTE: With a standard Boilermate the system neutral point is the thermal store and the heating circuit is under positive pressure at all points. In these circumstances inhibitors are not normally required.

Where it is known that the water supply in the area can give rise to corrosion, consideration should be given to the addition of an inhibitor to the heating system taking into account the capacity of the store and adding this to the capacity of the radiators and heating circuit in deciding the quantity of inhibitor to be added.

Set boiler thermostat to maximum.

The cylinder thermostat will have been factory set so that it controls the system (it will be sealed at the set position).

With the central heating system off, let the system heat up (with a 30,000 Btu boiler 1.5 hours approx).

Turn on the space heating system and adjust

the space heating pump speed to give a temperature difference of 11°C.

Check that the space heating system controls are functioning correctly.

Switch off space heating system.

*If the system is working correctly, THE CYLINDER THERMOSTAT WILL BE IN CHARGE. Thus when the boiler shuts down, the cylinder thermostat will be satisfied.

This will be indicated by the neon indicator being extinguished completely. Note that the lower pump should not switch off for approximately a further 4 minutes - this delay is built in to the BoilerMate control panel to purge the system. Should the neon not be extinguished when the boiler ceases to fire, then the boiler thermostat is in charge, and this is not correct.

To remedy this:

- ensure that the boiler thermostat is set to maximum.
- check that the temperature of the boiler flow is 80°C or above by measuring it as the flowpipe leaves the boiler casing **immediately** before the boiler shuts down.
If it is below 80°C, the boiler thermostat is at fault and the boiler manufacturer should be consulted.
- If the flow temperature is correct, establish that the difference between flow and return at the boiler is not more than 10°C and preferably 6°C or less. If it is more than 10°C, something is preventing circulation between boiler and BoilerMate - check that in accordance with good plumbing practice, an air vent has been fitted at the highest point of the return pipe from the BoilerMate to boiler (often at the bend above the boiler pump).
- increase the boiler pump setting if required
- check for obstructions in the pipework.
- If the above are all correct, the cylinder thermostat may be too high even though it has been factory set and sealed with wax. Reduce the thermostat setting little by little (breaking the sealing wax does not matter) until the cylinder thermostat is in control.
Instruct user on system controls.

IMPORTANT DO'S AND DONT'S

DO

Check the incoming mains water pressure. See page 2 under COLD SUPPLY.

DO

Check that all connections are in accordance with the labelling on the thermal store.

DO

adjust the ballvalve so that there is just enough water in the F&E cistern to float the ball when cold.

DO

make sure there is adequate clearance above the F&E cistern to service the valve.

DO

ensure that range-rated appliances are set at the **highest output** and the **boiler thermostat is set to maximum for all boilers.**

COMMISSIONING

DO

Insulate any exposed pipework in the BoilerMate cupboard.

DO

Plumb the overflow warning pipe from the F&E in 35mm or 22mm diameter (see page 8) to discharge in a conspicuous External position.

DO

Check the pump settings:

- 1 The pump between boiler and BoilerMate (the lower pump) should be set as high as possible (consistent with not creating noise) so as to give a small temperature difference across the boiler.
- 2 The pump on the radiator circuit (the higher pump) must be set so as to give a temperature difference across the radiator circuit of 11°C in the usual way.

DON'T

Use a combined feed and vent on BoilerMate installations.

DON'T

Use a BoilerMate on sealed **primary** systems.

DON'T

Use tube smaller than 28mm between boiler and BoilerMate when the boiler exceeds 60,000 Btu (17kW) output.

DON'T

Use dipped flow and return pipes between boiler and BoilerMate unless:

- 1 The boiler is suitable for sealed primary systems, **OR**
- 2 The boiler is directly vented to a feed and expansion tank. (see page 4 System design)

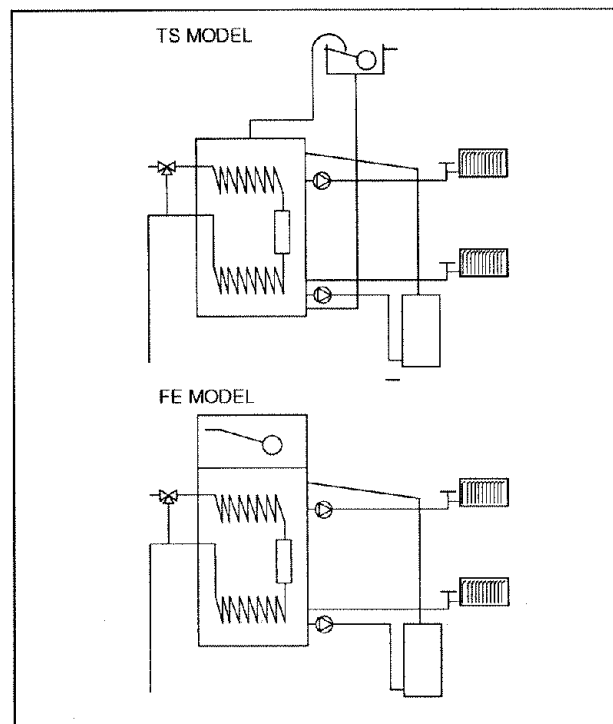
DON'T

Fit an FE pattern BoilerMate unless the water level in the feed and expansion cistern is at least 250mm above the highest point on the radiator circuit.

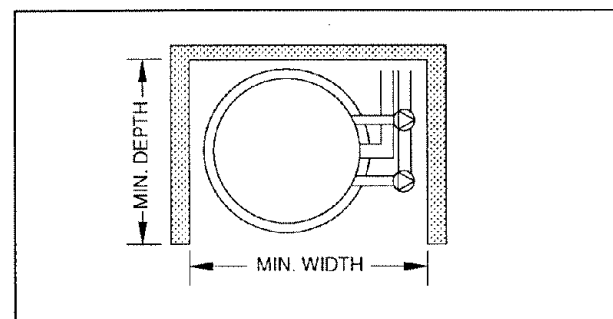
THE GLEDHILL BOILERMATE INSTALLATION IN TEN EASY STEPS

BoilerMate installation is easier and quicker than conventional vented systems because there is no secondary feed tank to bother with.

- 1 Read the design manual supplied with each unit. BoilerMate comes either as an FE model (primary circuit feed and expansion cistern attached) or a TS model (you must provide a separate feed and expansion cistern).
- 2 Inspect the position in which BoilerMate is to be fitted and check that the internal depth is at least 600mm and the width 700mm for models 120 140, 160, and 180; and 750mm



The TS BoilerMate full of water weighs 167kg (models 120 and 140) 210 kg (models 160 and 180) and 260kg (model 200). Add 10kg for FE models.



for model 200.

- 3 Plan the pipe connections. Each fitting on BoilerMate has its own label. You need to connect the following pipes:
 - a pumped flow and return pipes, in 22mm dia. for models 120, 140, 160 and 180 and 28mm diameter for model 200, from the body of the BoilerMate to the boiler.
 - b pumped flow and return pipes from the body of the BoilerMate to the radiators.
 - c cold mains water supply connections to the inlet side of the domestic hot water heating coil and to the ball valve in the FE cistern.
 - d domestic hot water supply pipe from the delivery of the dhw mixing valve to the taps.
 - e overflow warning pipe from the FE cistern to discharge in a conspicuous position externally.
 - f if you are fitting a TS model, check the route

COMMISSIONING

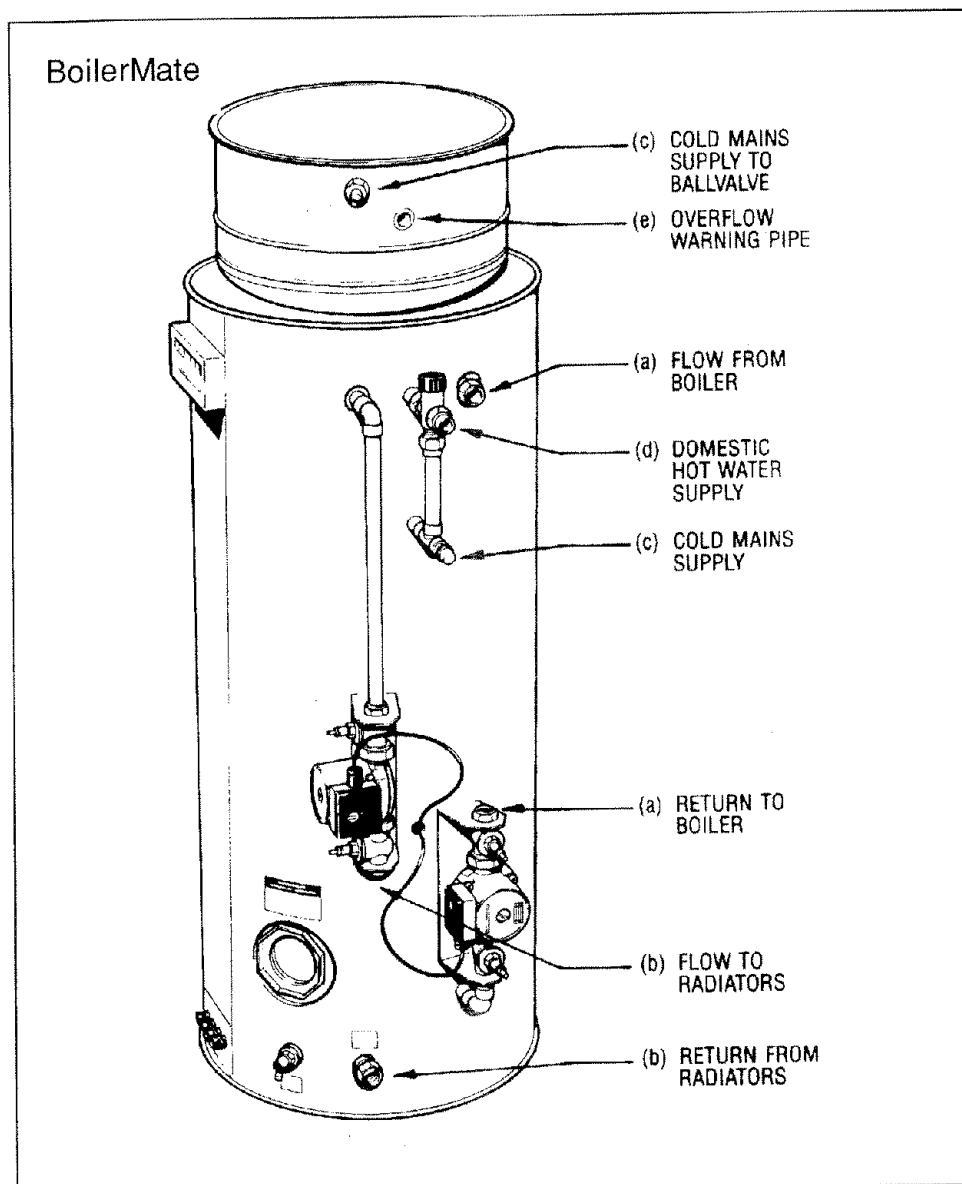
of the 22mm diameter open safety vent pipe and of the 15 mm diameter feed and expansion pipe from the boiler to cistern position. Also check the route of the overflow warning pipe.

All these pipe connections are shown diagrammatically in the illustration. When you have decided where the pipes are to run, check the space required for them inside the BoilerMate compartment.

- 4 Decide at what stage in your installation work you are going to fit the BoilerMate. We would suggest that in most cases the BoilerMate should be fitted first and pipes run from it to the boiler, radiators and domestic hot water supply system subsequently in that order.
- 5 remember that a bypass is not needed for any boiler as the thermal store acts as the by-pass itself.
- 6 Carry out the rest of the installation work, i.e.

boiler, radiators and hot water supply pipework. Connect the cold water supply pipework.

- 7 Fill the BoilerMate, radiators, boiler and pipework with water through the FE cistern. Adjust the ballvalve so that when cold there is just enough water in the cistern to float the ball. Flush the system out, fill again and vent.
- 8 Fill the domestic hot water heating coil with water and establish a flow through to the taps etc. Check that flow through all hot and cold water taps etc. is stopped when the mains water stop valve is closed.
- 9 The system now requires to be electrically connected.
- 10 The system is now ready to be commissioned in accordance with the instructions in the installation manual.



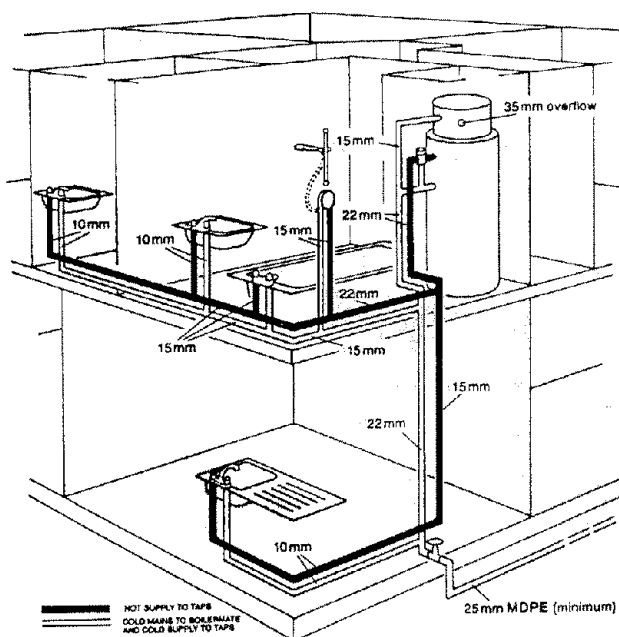
COMMISSIONING

SCHEMATIC PLUMBING AND HEATING LAYOUT FOR BOILERMATE IN A TYPICAL HOUSE WITH BATH AND SEPARATE SHOWER

General

It is particularly important in any mains pressure system that pipe sizing calculations should be in accordance with BS 6700 : 1987 based on sharing the available supply. The rule of thumb guidelines on this page should be adequate for most domestic situations.

Plumbing

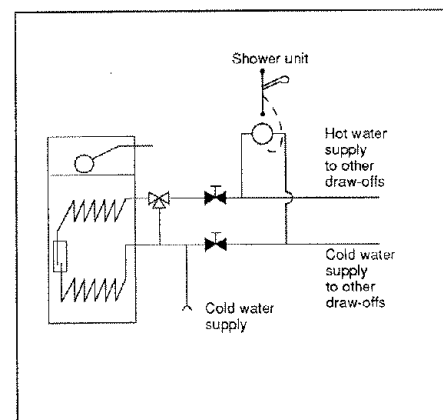
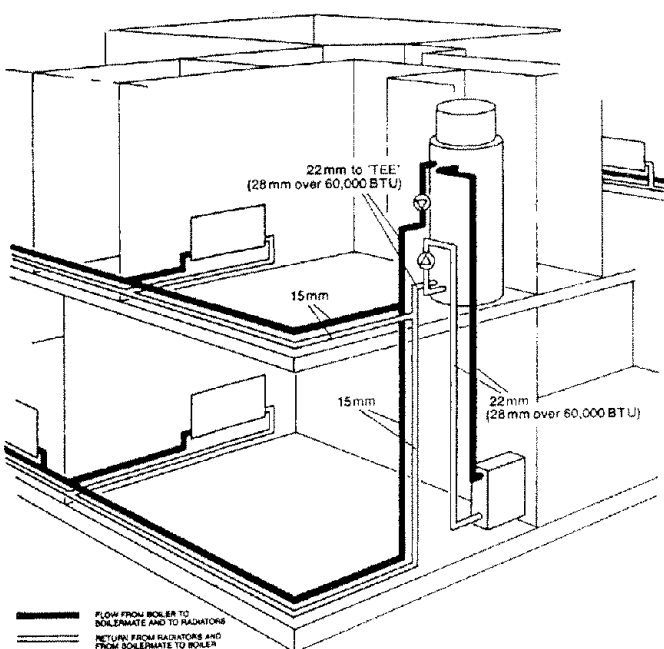


PLUMBING LAYOUT

NOTES:

- 1 Although a 15mm copper supply is sufficient for the smaller 1 bathroom dwelling a 22mm (25 ml MDPE) supply should be the minimum for larger dwellings.
- 2 Internally run in 22 mm copper to the BoilerMate and from the BoilerMate in 22mm past the hot draw-off to the bath.
- 3 All the tee-offs to the outlets should be in 10mm except for bath & showers.
- 4 Alternatively, tee-offs to terminal fittings in existing property can easily be fitted with flow restrictors to balance the simultaneous demand.
- 5 Either thermostatic or manual showers and mixer valves can be used as long as both hot and cold are mains fed. The hot water supply to a shower mixing valve should be fed directly from the BoilerMate and preferably should be the first draw-off point on the hot circuit. The cold supply to a shower mixing valve should be fed directly from the rising main and should be the first draw-off point on the cold circuit or ideally be an independent feed.

Heating



HEATING LAYOUT

NOTES:

- 1 The flow and return from the boiler always run directly to the BoilerMate and the flow should rise all the way to facilitate venting.
- 2 Where this is not possible refer to the installation manual.
- 3 The heating circuit is plumbed as in any other system.

FAULTS AND THEIR CAUSES

Any faults in the system design and malfunctions of system components will generate customer complaints. These complaints can be grouped into the following three main categories;

The system is noisy

Hot water service is unsatisfactory

Space heating is unsatisfactory

1 CAUSES OF 'NOISY SYSTEM'

a Noisy pump operation:

Check speed setting. If necessary, reduce pump speed.

Cavitation on account of insufficient static head on suction side (see system design)

b Noisy boiler operation:

If a boiler cycles frequently when there is no demand (ie during the night) check that the thermostat in the control panel of the BoilerMate is "in control" of the system, not the boiler thermostat.

Check this by verifying whether the cylinder thermostat is calling for heat when the boiler shuts down. (This will be indicated by the neon light remaining on when the boiler has gone off).

If this is the case, it is possible that the boiler thermostat is set too low. Check by reading the boiler flow temperature immediately before the boiler shuts down. It should be between 80°C and 82°C. The measured temperature at which the cylinder thermostat operates is 76°C.

The BoilerMate will operate with a boiler flow temperature as low as 78° with only a slight loss of performance. It may be necessary to edge the cylinder thermostat down under these circumstances to keep it "in control". If the cylinder thermostat has to be lowered so that it controls at a measured temperature of less than 73°C, there would be a serious loss of performance from the BoilerMate. In this event, the boiler thermostat should be adjusted upwards or changed, to give recommended flow temperature of 82°C.

Check flow rate through boiler. Increase pump speed and if necessary replace the pump.

Boiler heat exchanger may be scaled up, treat with non-acid de-scaler (such as Sentinel X200) or if necessary replace. (This work should be done with reference to the boiler manufacturer's instructions).

Check gas rate and adjust it if necessary.

c Noisy when hot water tap is opened:

Water hammer. Loose pipework and/or tap washers.

2 CAUSES OF 'UNSATISFACTORY HOT WATER SERVICE'

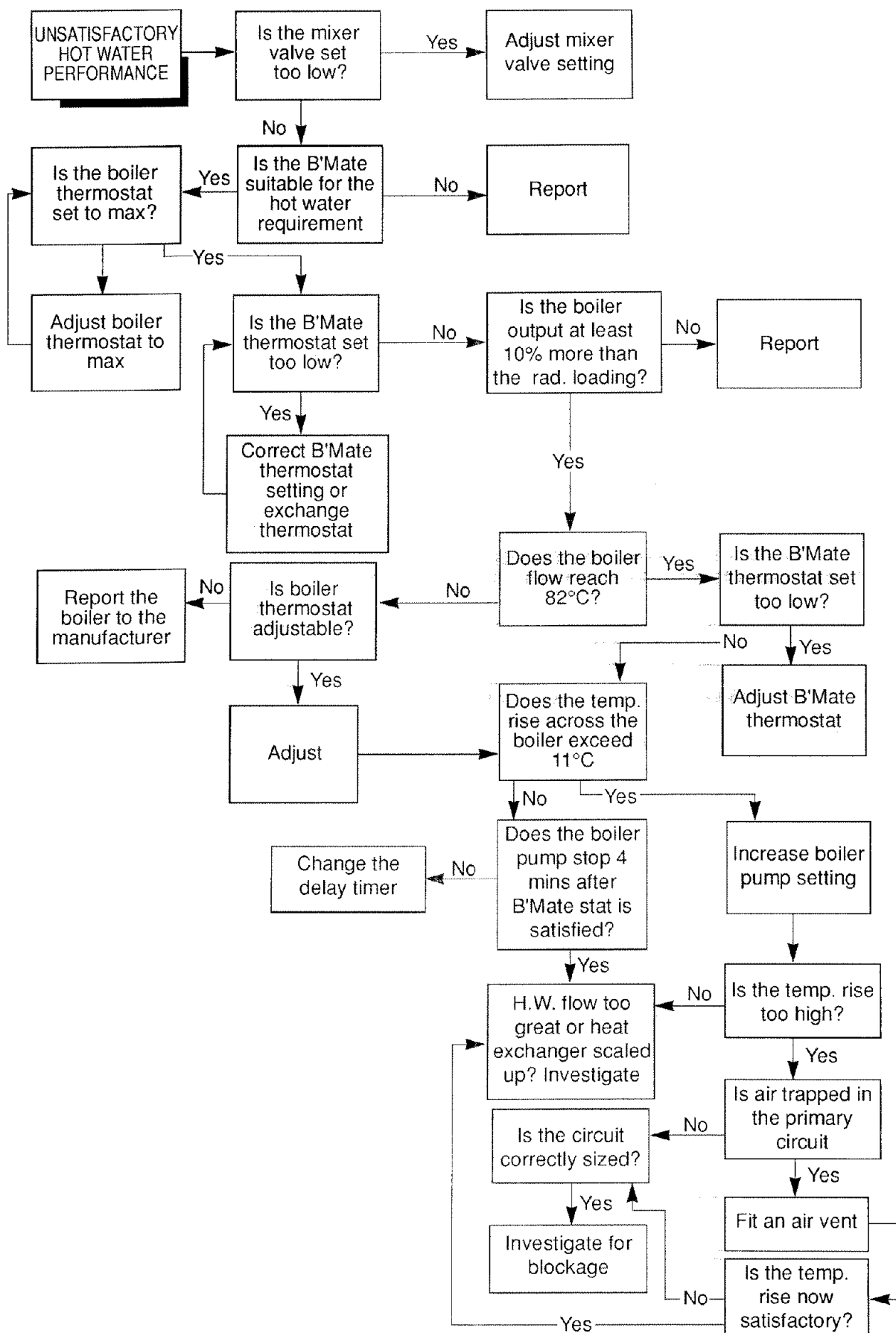
- a Cylinder thermostat set too low. Cylinder thermostat should be factory set but if hot water service is poor follow the instructions for setting the cylinder thermostat (see page 13)
- b Check boiler thermostat setting. This should be set at maximum.
- c Check thermostatic mixing valve. If necessary, adjust to deliver water hotter or cooler as needed.
- d Hot water flow rate may be too high to pick up sufficient heat. Reduce flow to give acceptable temperature. This would only be true if the cold water supply is above 5 bar. In this case a pressure limiting device should be fitted (page 2).
- e The space heating load is greater than the boiler capacity.
- f If the pump between the boiler and thermal store runs for more than 5 minutes after the boiler has shut down, and the neon has been completely extinguished during this time, then the delay timer has failed.

3 CAUSES OF 'UNSATISFACTORY SPACE HEATING'

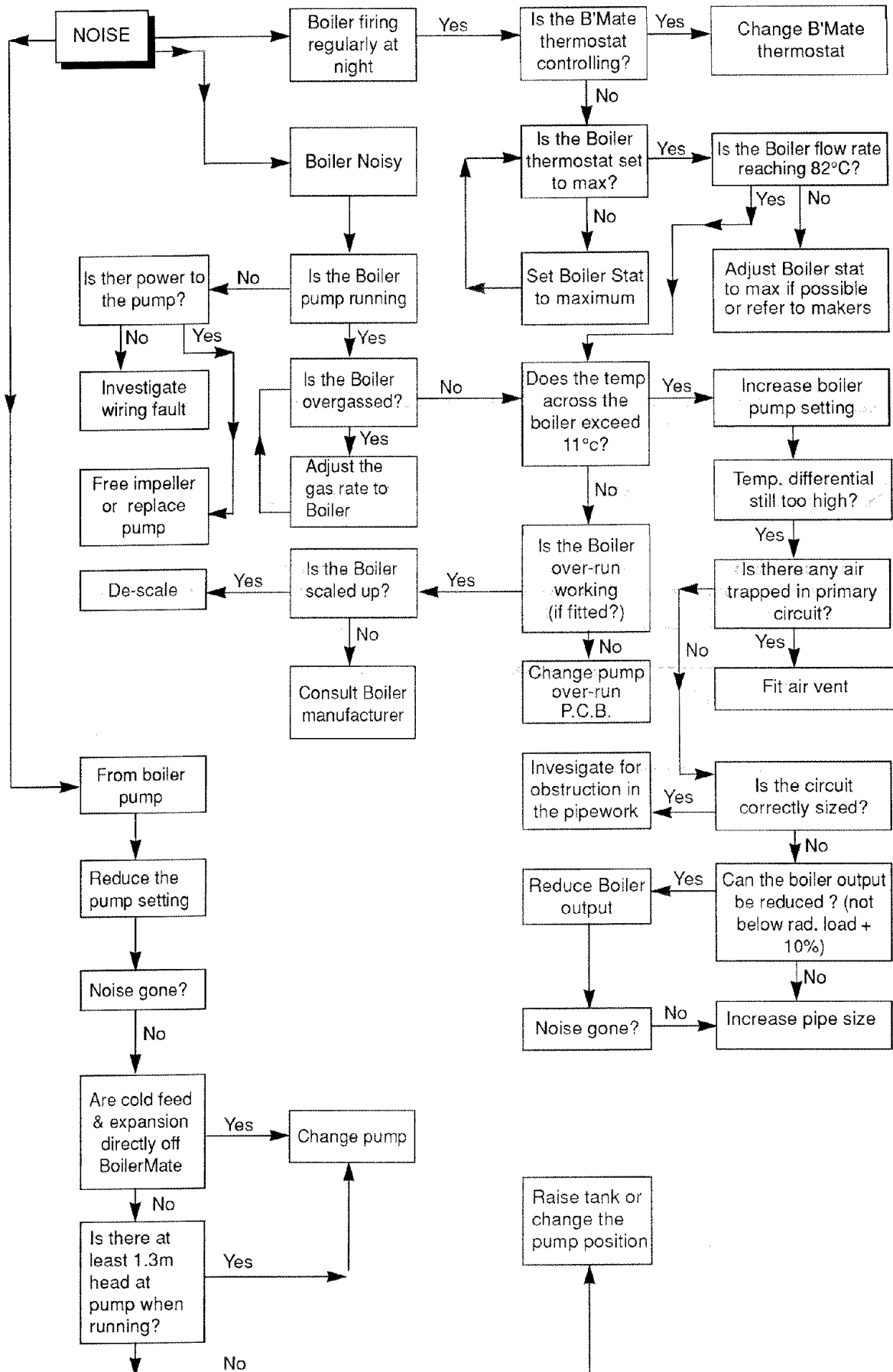
- a Check cylinder thermostat (See 2a) above.
- b Check boiler thermostat. This should be set at maximum.
- c Check operation and setting of the room thermostat.
- d If some rooms are not being heated properly, then increase the pump speed and if necessary balance the system.
- e If radiators get warm when heating is off, then install gravity check valve in the heating circuit.

COMMISSIONING

BOILERMATE FAULT FINDING

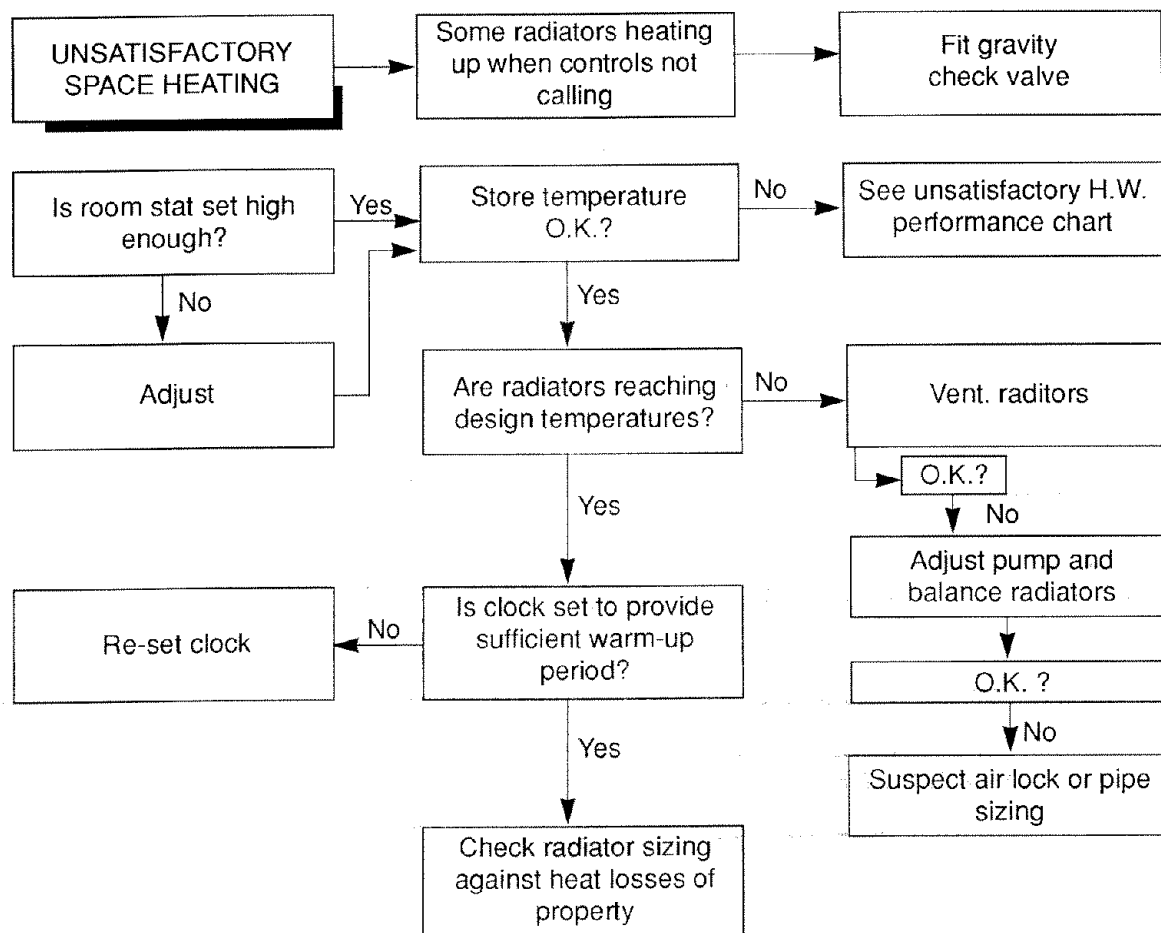


BOILERMATE FAULT FINDING



COMMISSIONING

BOILERMATE FAULT FINDING

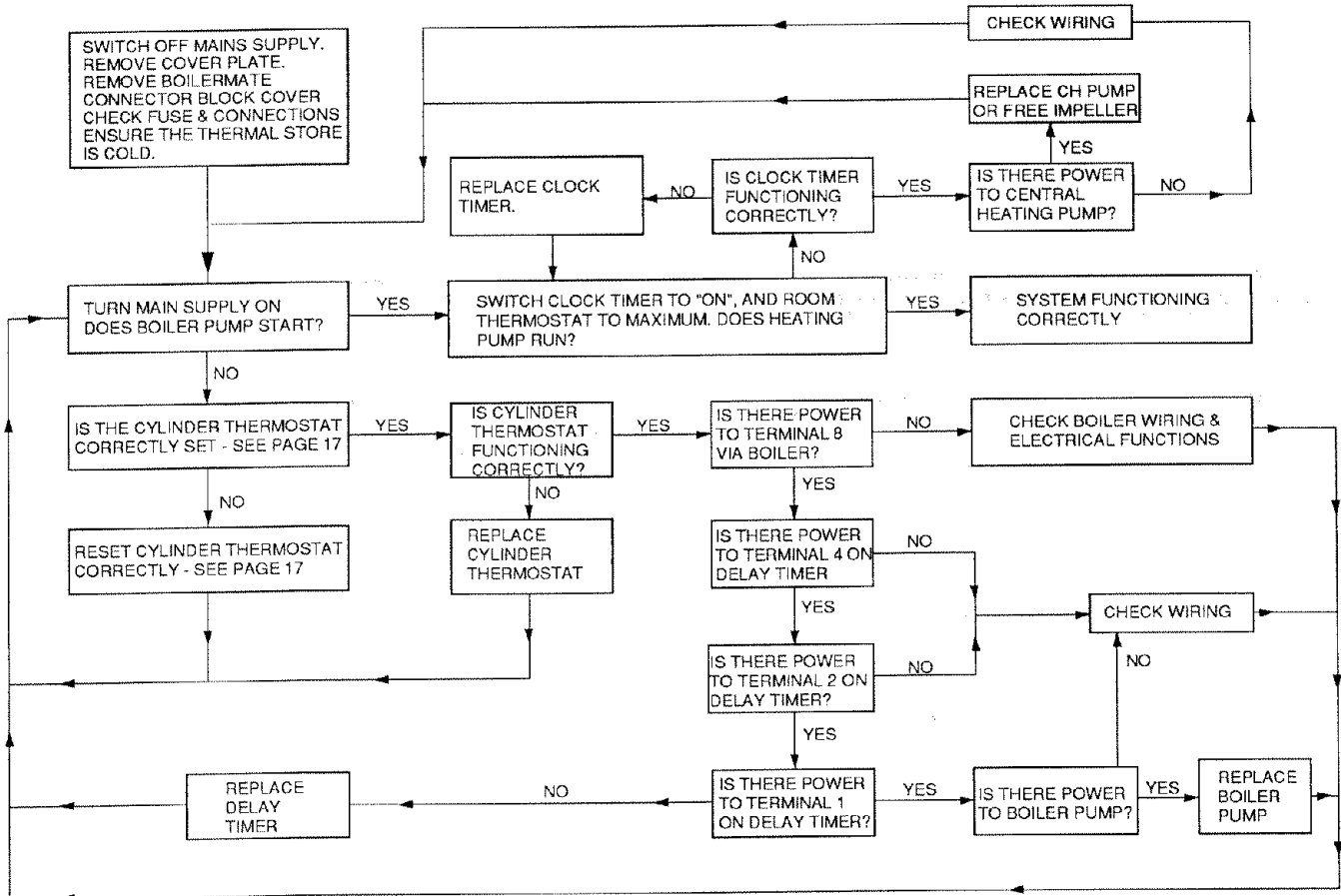


Warranty

The thermal store is covered by a five year warranty. Any components used are covered by warranties issued by the manufacturers concerned.

Gledhill's 'standard condition of sale' are set out in this manual.

BOILERMATE ELECTRICAL FAULT FINDING CHART



In the interest of continuously improving the BoilerMate range, Gledhill Water Storage Ltd. reserve the right to modify the product without notice, and in these circumstances this booklet, which is accurate at the time of printing, should be disregarded.

The BoilerMate has been developed in conjunction with British Gas plc.

SERVICING

In situations where descalers have not been fitted and the hot water service has deteriorated a BoilerMate can be descaled very easily with equipment available from Gledhill.

You can now do the whole job easily and efficiently on site - and do it in under the hour.

The operation is carried out by a VORTEX DECALOMAT 3 Descaling Unit which removes the scale chemically. By simply replacing the thermostatic mixing valve on the hot water outlet with the special adaptor valve supplied, descaling solution is pumped through the secondary coil (see diagram). After approximately 45 minutes the job is done and the mixer valve is put back in place. The solution is made up of 2kg of Fernox DS-3 descaling powder dissolved in 20 litres of water (preferably warm). Maximum circulating capacity is 3000 litre/hr with a maximum system pressure of 6 bar. The Fernox powder is manufactured with a colour indicator which changes from a yellow solution through green to blue as the active ingredients are used up.

TO DE-SCALE BOILERMATE USING DECALOMAT-3

- 1 Before descaling turn the boiler off and run the hot water tap until the thermal store is below 40°C.
- 2 Turn off mains water supply at stop tap supplying BoilerMate.
- 3 Open a hot tap on the hot water system.
- 4 Break the three unions securing the oventrop M.V. to the BoilerMate and remove the oventrop M.V. making sure a container is in place to collect spillage.
- 5 Attach the adaptor to the BoilerMate - two unions and washers.

- 6 Close all hot taps on the dhw system.

To charge Decalomat-3

- 6 Unscrew the large cap adjacent to the carrying handle.
- 7 Make sure that the hoses are connected together with brass nipple.
- 8 Partly fill the Decalomat-3 with 20 litres of Fernox DS-3 solution (the solution should be 2 kgm Fernox DS-3 crystals dissolved in 20 litres of water).

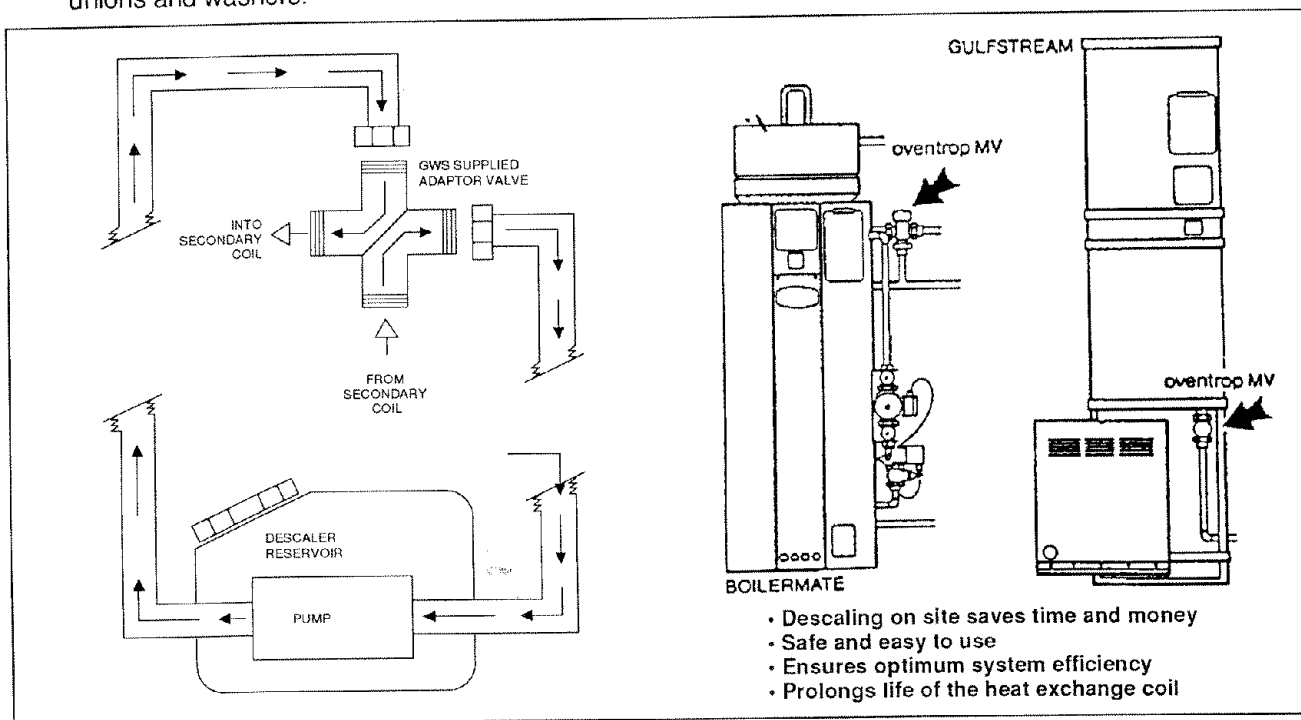
NOTE: This solution is ACID and it is a very wise precaution to do any mixing, filling or emptying of this solution outside the house.

Observe Fernox's handling instructions.

- 9 Replace the filling cap on the Decalomat-3.
- 10 Break the joint between the hose (keeping both hoses above the level of the Decalomat-3) retaining the brass joining piece.
- 11 Attach the hoses to the adaptor (ensure that the unions are finger tight on the $\frac{3}{4}$ " BSP male connections to the adaptor).
- 12 Loosen the filling cap on the Decalomat - to allow carbon dioxide formed in the descaling process to escape.
- 13 Plug in the Decalomat-3 to a 240V 50Hz electric supply.

The pump in the Decalomat will now circulate the Yellow Fernox DS-3 solution through the heat exchanger coil of the BoilerMate. Depending on the degree of scale formation within the coil the following may be observed:

- 1 The yellow Fernox DS-3 solution will be observed in one of the transparent plastic tubes, foam and a greenish blue liquid may be



- Descaling on site saves time and money
- Safe and easy to use
- Ensures optimum system efficiency
- Prolongs life of the heat exchange coil

- 2 Flow of the yellow Fernox Ds-3 may initially be intermittent due to:
 - a gas formation in the coil as the Fernox DS-3 attacks the scale.
 - b Degree of blockage - this stage may exist for about half an hour.
- 3 Continuous flow will begin with the yellow DS-3 solution in one pipe and a foaming solution in the other.
- 4 If after some time the colour in both pipes has turned to green (no gas bubbles are observed) the Fernox DS-3 is now spent and requires changing.
- 5 When the solution in both tubes is still yellow and no gas bubbles are observed, the coil has been descaled.

TO REMOVE DECALOMAT

- 1 Unplug Decalomat from electrical supply.
- 2 Tighten the filling cap on the Decalomat.
- 3 Remove the two hoses from the adaptor.
- 4 Join hoses with brass connector piece.
- 5 Remove adaptor.
- 6 Replace oventrop mixing valve - **ensuring that it is the correct way round.**
- 7 Open a hot tap - preferably to a porcelain or plastic sink.
- 8 Turn on mains water supply to BoilerMate.
- 9 Allow the system to flush via open hot tap for some minutes then flush out system at each hot tap.

REMOTE FIXING OF THE GRASSLIN DIGITAL PROGRAMMED TIMER OR THE ELECTRO-MECHANICAL CLOCK TIMER.

A Remote Fixing Kit is available for this purpose, consisting of:

- 1 Backplate - complete with terminal strip.
- 2 Clock cover (surface mounting) complete with 2 No. retaining screws.
- 3 Terminal strip cover.
- 4 Opaque dust cover.

Procedure

(This work must be carried out by a qualified person)

First switch off the power to the BoilerMate.

Remove the transparency dust cover from the clock.

Remove the flush mounted clock by turning the two plastic screws $\frac{1}{4}$ turn anticlockwise. The clock may now be withdrawn.

Remove the spade connectors from the clock terminals.

Remove the clock wires from the main terminal strip of the BoilerMate. These are from terminals

1, 2 and 9 and are shown as broken lines on the wiring diagram.

Mount the backplate in the required remote position, using 3 No. 6 gauge round head screws.

Connect the backplate to the main BoilerMate terminal. Refer to the wiring diagram. Do not forget to link terminals 1 and 3 of the backplate.

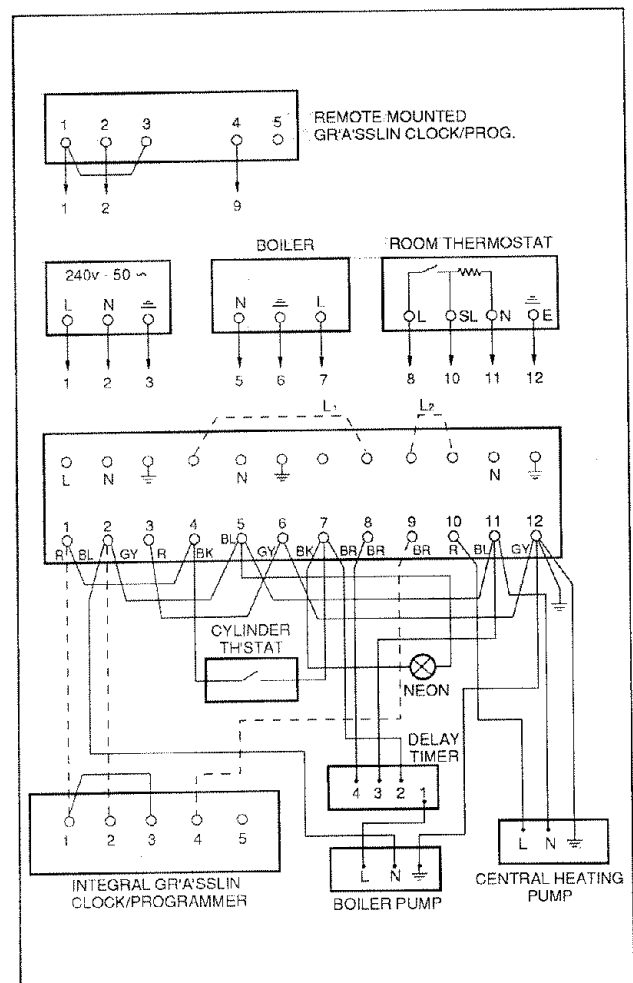
Remove the clock module from its flush mounting casing. This casing, together with the opaque dust cover can now be in used to blank off the hole in the BoilerMate front panel.

Mount the clock module onto the backplate, using the two locating pins. Press the clock home to engage its terminals into the terminal block.

Slide the terminal strip cover into position. (Note that knock-outs are provided for surface wiring).

Fit the clock cover (surface mounting) and secure with the two screws provided.

Switch on the power and check out. Programme the clock to required heating cycle. Fit transparent dust cover.



SERVICING

The most effective service from a thermal storage system is when the boiler is on demand for twenty four hours. In special circumstances the system can be wired to isolate the boiler overnight by reference to Fig 16 or 17 as appropriate.

Figure 16

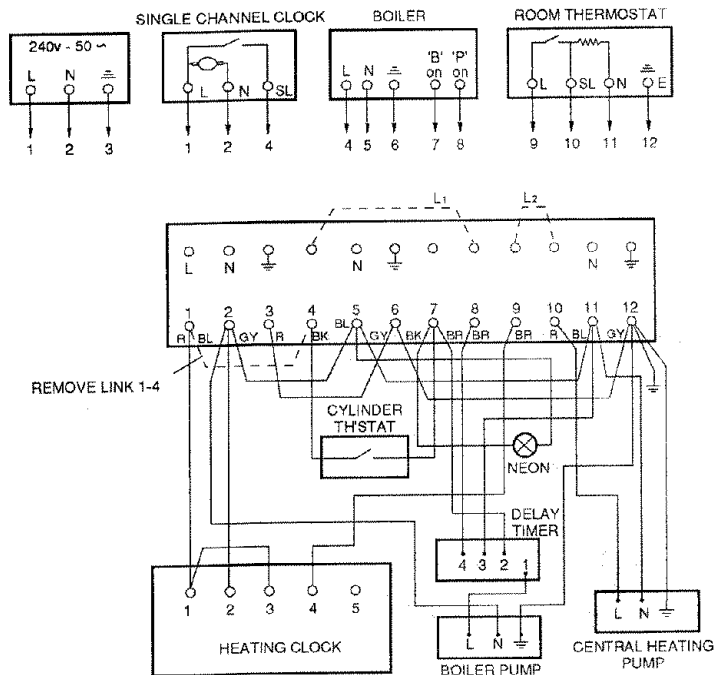
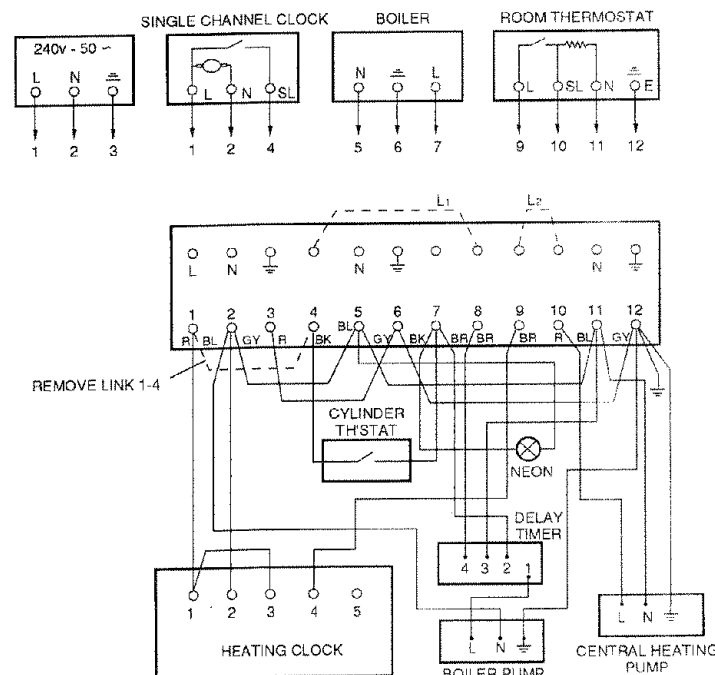


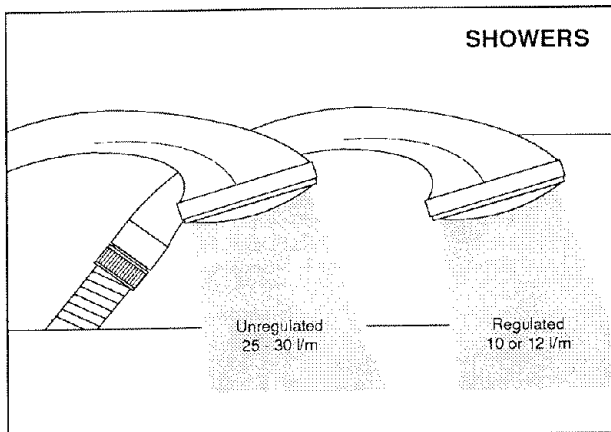
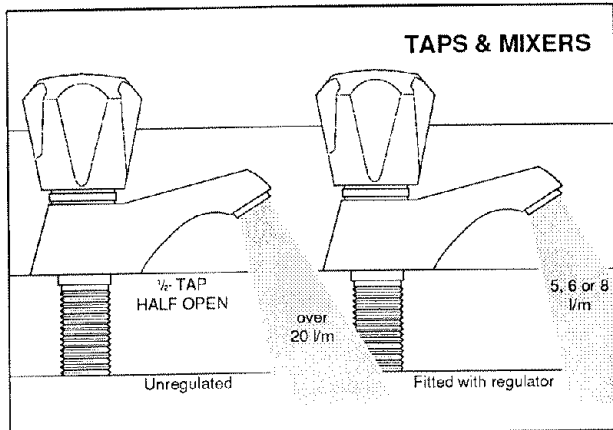
Figure 17



APPENDIX

WATER SAVING

WATER RELATED COSTS CAN BE REDUCED BY GOOD PLUMBING PRACTICE.



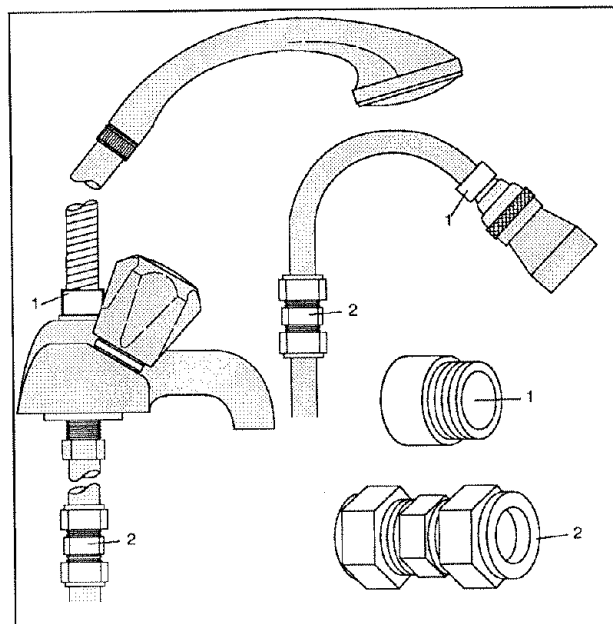
Vast quantities of water are needlessly run off to waste due to Taps, Mixers, and Showers discharging flow rates far in excess of the rates required for them to perform their duties.

The contrasting flow rates shown on this leaflet clearly illustrate the savings that can be made whilst still providing a good performance. British made AQUAFLOW REGULATORS provide constant flow rates by automatically compensating for supply pressure changes between 1 bar & 10 bars.

To facilitate installation into the wide range of plumbing equipment which is encountered in the U.K. FOUR FIXING OPTIONS are available:-

OPTIONS FOR SHOWERS

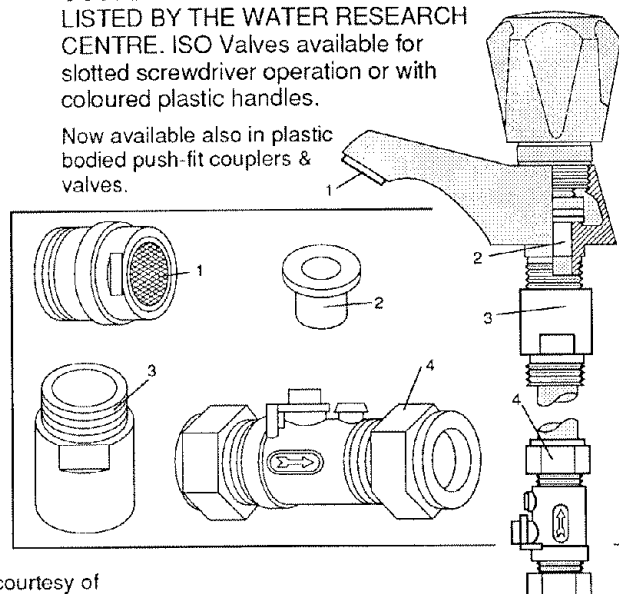
1. MXF "DW" RANGE - For fitting behind Fixed Shower Heads or onto Flexible Hoses for Handshowers (Preferably onto the inlet end when lightweight hoses are used).
2. COMPRESSION FITTING RANGE - "In Line" regulators as in option 4 for Taps & Mixers.



4 FIXING OPTIONS FOR TAPS & MIXERS

1. MK RANGE - Combined Regulators & Aerator for screwing onto Taps & Mixers with internal or external threads on their noses. Anti Vandal models also available.
2. MR05-T RANGE - Internal Regulators. Push fit into Tap or Mixer seats. Produced in three sizes - 12.5mm (BS1010), 12mm & 10mm, Flangeless models also available for Taps with Low Lift washers.
3. MXF STANDARD RANGE - Screw on tail models for Taps & Mixers. Fix onto the tails before fitting the tap connectors. Available in 3/8", 1/2", 3/4", & 1" BSP.
4. COMPRESSION FITTING RANGE - "In Line" regulators housed in 15mm & 22mm CXC COUPLERS & ISOLATING VALVES. "A" UK WFBS LISTED BY THE WATER RESEARCH CENTRE. ISO Valves available for slotted screwdriver operation or with coloured plastic handles.

Now available also in plastic bodied push-fit couplers & valves.



Information by courtesy of

AQUAFLOW REGULATORS LTD.

Haywood House, 40 New Road, Stourbridge, West Midlands DY8 1PA.

Telephone: (0384) 442611 Fax: (0384) 442612

Gledhill (Water Storage) Ltd

AMD. MAY 2006

CONDITIONS OF SALE & WARRANTY TERMS

1. We only do business upon the Conditions which appear below and no other. Unless we so agree in writing these Conditions shall apply in full to any supply of goods by us to the exclusion of any Conditions or terms sought to be imposed by any purchaser. These Conditions of Sale and Warranty Terms override those which are contained on the Invoice Forms and all Sales are now subject to these Conditions of Sale and Warranty terms only.

2. PRICE

Once an order or call off has been accepted the price will be held for three months **but if delivery is extended beyond that period at the customer's request, then we reserve the right to amend the price when necessary.** The company reviews its pricing annually to adjust for changes in our cost base. We reserve the right to alter prices at any time for severe movements in raw materials (mainly copper and steel). If there is to be a change we will give customers at least thirteen weeks notice but anything delivered after that date will be at the revised price. An order may not be cancelled or varied after acceptance without the written consent of the company. Such cancellation or variation shall be subject to such reasonable charges as may be appropriate.

3. SPECIFICATION

The goods are supplied in accordance with the Specifications (if any) submitted to the Purchaser and any additions and alterations shall be the subject of an extra charge. Any goods not so specified shall be in accordance with our printed literature or the literature of any of our component suppliers (subject to any modifications made since publication). If we adopt any changes in construction or design of the goods, or in the specification printed in our literature, the Purchaser shall accept the goods so changed in fulfilment of the order.

4. PAYMENT

The invoice price of goods shall be payable within 30 days of despatch by us of our invoice for the goods or such longer time as may be stated by our quotation or invoice. If we receive payment in full on or before the due date we will allow an appropriate settlement discount except where we have quoted a special net price. If payment is not received in full on or before the due date we shall be entitled in addition to the invoice price to:

- (i) payment of a sum equal to any increase in the copper price supplement applicable to the particular goods sold between the date of receipt of order and the date of receipt of payment in full; and
- (ii) interest on any part of the invoice price unpaid after the due date at the rate of 3% per annum over the base rate for the time being of HSBC Bank plc.

5. TIME

We give estimates of delivery dates in good faith and time of delivery is not nor shall be made of the essence of any contract nor shall we be liable for any loss or damage occasioned by delay in delivery.

6. DELIVERY

We deliver free normally by our own vehicles within 25 miles of any of our manufacturing depots. Delivery to any place more than 25 miles from one of our manufacturing depots is subject to our quoted delivery charges. We reserve the right to make delivery of goods contained in one order by more than one consignment and at different times. Where a period is agreed for delivery and such period is not extended by our Agreement, the Purchaser shall take delivery within that period. If the Purchaser fails to take delivery, we shall be entitled at the Purchaser's risk and expense to store the goods at the Purchaser's premises or elsewhere and to demand payment as if they had been despatched. Off loading at point of delivery shall be the responsibility of and be undertaken by the Purchaser.

7. SHORTAGES OR DAMAGE

Goods must be inspected before signature of delivery note and any damage, shortage or discrepancy noted on the delivery note and the goods returned on the same vehicle. The buyer must also give us immediate written notice of the damage, shortage or discrepancy so that we may prompt investigation.

8. RETURN OF GOODS

Goods may not be returned to the Company except by prior written permission of an authorised officer of the Company and such return shall be subject to payment by the Purchaser of handling and re-stocking charges, transport and all other costs incurred by the Company.

9. COMPANY LIABILITY

All our goods are made of the best materials from reputable manufacturers and where stated are manufactured to the appropriate British Standard. Complaints must be given to us immediately, before any action is taken, as responsibility cannot be accepted if repairs or renewals are attempted on site without our written authority.

Defects caused by corrosion or scale deposits are not covered by this guarantee save as expressly provided in paragraph (4) of this Condition 9.

Where we agree to rectify any defect, we reserve the right to undertake the work on our own premises.

The following guarantee covers faulty materials and manufacture for the stated period, **provided that:-**

- The unit has been installed in accordance with our installation and service instructions and all relevant codes of practice and regulations in force at the time of installation.
- That all necessary inlet controls and safety valves have been fitted correctly.
- It has only been used for the storage of potable water supplied from the public mains.
- **Where appropriate the unit has been regularly maintained as detailed in the installation and service instructions.**

(1) Domestic and Commercial Open Vented Cylinders and Tanks.

If the copper cylinder or tank or any integral pipework proves to be defective either in materials or workmanship, we will either repair or supply replacement at our option with the closest substitute in the case of any obsolete product to any address in Great Britain.

- (a) free of all charge during the first year after delivery by us.
- (b) thereafter at a charge of one-tenth of the then current list price and any copper price supplement and delivery charge during the second year after delivery by us and increasing by a further one-tenth on the second and subsequent anniversary of delivery by us.

AND FURTHER we will meet the contractors/installers reasonable costs in removing and replacing any defective Open Vented Copper Cylinder or Tank with defective integral pipework as follows:

- (i) in the case of vessels of less than 80 imperial gallons capacity up to a maximum of one-half of the extent of our liability in regard to the replacement product expressed in (1) (a) and (b) above
- ii) in the case of vessels larger than 79 imperial gallons capacity up to a maximum of one-quarter of the extent of our liability in regard to the replacement product as expressed in paragraphs (1) (a) and (b) above.

(2) Domestic Mains Fed Products

If the copper storage vessel itself or any integral pipework as part of the storage vessel assembly proves to be defective either in materials or workmanship, we reserve the right to either repair or supply replacements or the closest possible substitute in the case of any obsolete product and will collect and deliver to any address in England, Wales and Scotland (excluding all Scottish Islands).

(a) free of all charge during the first year after delivery by us.

(b) thereafter at a charge of one-fifth of the then current list price or any copper price supplement and delivery charge during the second year after delivery by us increasing by a further one-fifth on the second and subsequent anniversary of delivery by us.

AND FURTHER we will meet the contractors/installers reasonable costs in removing and replacing any defective copper storage vessel or storage vessel with defective integral pipework from the Domestic Mains Pressure Range of products up to a maximum of one-third of the extent of our liability in regard to the replacement product expressed in (2) (a) and (b) above.

(3) Integrated Boiler and Storage Vessel Products and Stand Alone Boilers

In the case of the GulfStream range of products and the Gledhill boiler range of products, Gledhill guarantees the heat exchanger (boiler) for material and construction faults for two years and FURTHER we will meet the installer/contractors reasonable costs in removing and replacing any DEFECTIVE heat exchanger up to a MAXIMUM of one third of the extent of our liability in regard to the replacement product.

THE RESPONSIBILITY FOR THE EXECUTION OF THIS GUARANTEE LIES WITH THE INSTALLER.

The guarantee becomes null and void if the appliance is used incorrectly, or in the event of proven negligence or incorrectly implemented repairs **OR FAILURE TO CARRY OUT THE RECOMMENDED INSPECTION/MAINTENANCE.** The guarantee also becomes null and void if changes are made to the appliance without our knowledge, or if the serial number on the appliance is removed or made illegible.

The annual service must be carried out by a competent installer in accordance with the advice given by Gledhill and using Gledhill approved parts.

(4) Components of our products other than Storage Vessels and Integral Pipework.

We will either extend to the purchaser the same terms of warranty as we are given by the manufacturer of the component or if the manufacturer does not give any warranty, replace free of charge any component which becomes defective within twelve months after the date of the delivery by us and is returned to us at the purchaser's expense but we shall not meet the cost of removal or shipping or return of the component or any other cost charges or damages incurred by the purchaser.

If the appliance manufactured by Gledhill incorporates a factory fitted scale inhibitor then during the period of three years from the date of delivery Gledhill will replace, free of charge, any plate heat exchanger fitted in the appliance as original equipment in which scale formation occurs that materially reduces the effectiveness of the plate heat exchanger. This guarantee does not extend to any other component installed within the Gledhill appliance or elsewhere in the Purchaser's domestic water system.

(5) General

In the case of goods manufactured solely in accordance with our specification and designs and in respect of any installation work carried out by or on our behalf, our entire liability and the purchaser's sole remedies (subject to (1-4) above) and shall be as follows:

(a) we accept liability for death or personal injury to the extent that it results from our negligence that of our employees agents or subcontractors.

(b) subject to paragraph (d) below, we accept liability for direct physical damage to tangible property to the extent that such damage is caused by our negligence that of our employees agents or subcontractors.

(c) our total liability to the purchaser over and above any liability to replace under (1 - 4) above (whether in contract or in tort including negligence) in respect of any one cause of loss or damage claimed to result from any breach of our obligations hereunder, shall be limited to actual money damages which shall not exceed £20,000 provided that such monetary limit shall not apply to any liability on the part of ourselves referred to in paragraph (a) above.

(d) except as provided in paragraph (a) above but otherwise notwithstanding any provision herein contained in no event shall we be liable for the following loss or damage howsoever caused and even if foreseeable by us or in our contemplation :-

(i) economic loss which shall include loss of profits, business revenue, goodwill or anticipated savings.

(ii) damages in respect of special indirect or consequential loss or damage (other than death, personal injury and damage to tangible property).

(iii) any claim made against the purchaser by any other party (save as expressly provided in paragraph (b) above).

(e) except in respect of our liability referred to in paragraph (a) above no claim may be made or action brought (whether in contract or in tort including negligence) by the purchaser in respect of any goods supplied by us more than one year after the date of the invoice for the relevant goods.

(f) nothing in these Conditions shall confer on the purchaser any rights or remedies to which the purchaser would not otherwise be legally entitled.

(6) Notwithstanding any other provision contained herein the Purchaser's hereby agree to fully indemnify us against any damages losses costs claims or expenses incurred by us in respect of any claim brought against us by any third party for :-

(a) any loss injury or damage wholly or partly caused by any goods supplied by us or their use.

(b) any loss injury or damage wholly or partly caused by the defective installation or sub-standard workmanship or materials used in the installation of any goods supplied by us.

(c) any loss injury or damage in any way connected with the performance of this contract.

PROVIDED that this paragraph (6) will not require the Purchaser to indemnify us against any liability for our own acts of negligence or those of our employees agents or sub-contractors.

FURTHER in the case of goods supplied by us which are re-sold to and installed by a third party by the Purchaser it will be the sole responsibility of the Purchaser to test the goods immediately after their installation to ensure that inter alia they are correctly installed and are in proper working order, and are not likely to cause any loss injury or damage to any person or property.

10. VARIATION OF WARRANTY AND EXCLUSION

Should our warranty and exclusion be unacceptable we are prepared to negotiate for variation in their terms but only on the basis of an increase in the price to allow for any additional liability or risk which may result from the variation.

Purchasers are advised to insure against any risk or liability which they may incur and which is not covered by our warranty.

11. RISK AND RETENTION OF TITLE

(a) goods supplied by us shall be at the Purchaser's risk immediately upon delivery to the Purchaser or into custody on the Purchaser's behalf or to the Purchaser's Order. The Purchaser shall effect adequate insurance of the goods against all risks to the full invoice value of the goods, such insurance to be effective from the time of delivery until property in the goods shall pass to the Purchaser as hereinafter provided.

(b) property in the goods supplied hereunder will pass to the Purchaser when full payment has been made by the Purchaser to us for :-

(i) the goods of the subject of this contract.

(ii) all other goods the subject to of any other contract between the Purchaser and us which, at the time of payment of the full price of the goods sold under this contract, have been delivered to the Purchaser but not paid for in full.

(c) until property in the goods supplied hereunder passes to the Purchaser in accordance with paragraph (2) above.

(i) the Purchaser shall hold the goods in a fiduciary capacity for us and shall store the same separately from any other goods in the Purchaser's possession and in a manner which enables them to be identified as our goods.

(ii) the Purchaser shall immediately return the goods to us should our authorised representative so request. All the necessary incidents associated with a fiduciary relationship shall apply.

(d) the Purchaser's right to possess the goods shall cease forthwith upon the happening of any of the following events, namely :-

(i) if the Purchaser fails to make payment in full for the goods within the time stipulated in clause 4 hereof.

(ii) if the Purchaser, not being a company, commits any act of bankruptcy, makes a proposal to his or her creditors for a compromise or does anything which would entitle a petition for a Bankruptcy Order to be presented.

(iii) if the Purchaser, being a company, does anything or fails to do anything which would entitle an administrator or an administrative receiver or a receiver to take possession of any assets or which would entitle any person to present a petition for winding up or to apply for an administration order.

(e) the Purchaser hereby grants to us an irrevocable licence to enter at any time any vehicle or premises owned or occupied by the Purchaser or in the possession of the Purchaser for the purposes of repossessing and recovering any such goods the property in which has remained in us under paragraph (2) above. We shall not be responsible for and the Purchaser will indemnify us against liability in respect of damage caused to any vehicle or premises in such repossession and removal being damaged which it was not reasonably practicable to avoid.

(f) notwithstanding paragraph (3) hereof and subject to paragraph (7) hereof, the Purchaser shall be permitted to sell the goods to third parties in the normal course of business. In this respect the Purchaser shall act in the capacity of our commission agent and the proceeds of such sale :-

(i) shall be held in trust for us in a manner which enables such proceeds to be identified as such, and :

(ii) shall not be mixed with other monies nor paid into an overdrawn bank account.

We, as principal, shall remunerate the Purchaser as commission agent a commission depending upon the surplus which the Purchaser can obtain over and above the sum stipulated in this contract of supply which will satisfy us.

(g) in the event that the Purchaser shall sell any of the goods pursuant to clause (6) hereof, the Purchaser shall forthwith inform us in writing of such sale and of the identity and address of the third party to whom the goods have been sold.

(h) if, before property in the goods passes to the Purchaser under paragraph (2) above the goods are or become affixed to any land or building owned by the Purchaser it is hereby agreed and declared that such affixation shall not have the effect of passing property in the goods to the Purchaser. Furthermore if, before property in the goods shall pass to the Purchaser under paragraph (2) hereof, the goods are or become affixed to any land or building (whether or not owned by the Purchaser), the Purchaser shall:-

(i) ensure that the goods are capable of being removed without material injury to such land or building.

(ii) take all necessary steps to prevent title to the goods from passing to the landlord of such land or building.

(iii) forthwith inform us in writing of such affixation and of the address of the land or building concerned.

The Purchaser warrants to repair and make good any damage caused by the affixation of the goods to or their removal from any land or building and to indemnify us against all loss damage or liability we may incur or sustain as a result of affixation or removal.

(i) in the event that, before property in the goods has passed to the Purchaser under paragraph (2) hereof, the goods or any of them are lost, stolen, damaged or destroyed :-

(i) the Purchaser shall forthwith inform us in writing of the fact and circumstances of such loss, theft, damage or destruction.

(ii) the Purchaser shall assign to us the benefit of any insurance claim in respect of the goods so lost, stolen, damaged or destroyed.

12. NON-PAYMENT

If the Purchaser shall fail to make full payment for the goods supplied hereunder within the time stipulated in clause 4 hereof or be in default of payment for any other reason then, without prejudice to any of our other rights hereunder, we shall be entitled to stop all deliveries of goods and materials to the Purchaser, including deliveries or further deliveries of goods under this contract. In addition we shall be entitled to terminate all outstanding orders.

13. RISK

All goods sold by us shall be at the sole risk of the Purchaser from the date of despatch by us of the invoice for their price.

14. VALUE ADDED TAX

All prices quoted are exclusive of Value Added Tax which will be charged at the rate ruling at the date of despatch of invoice.

15. TRADE SALES ONLY

We are only prepared to deal with those who are not consumers within the terms of the Unfair Contract Terms Act 1977, the Sale of Goods Act 1979 and the Supply of Goods and Services Act 1982. Accordingly any person who purchases from us shall be deemed to have represented that he is not a consumer by so purchasing.

16. JURISDICTION

The agreement is subject to English/Scottish law and any dispute arising hereunder shall be settled in accordance therewith dependent upon the location.