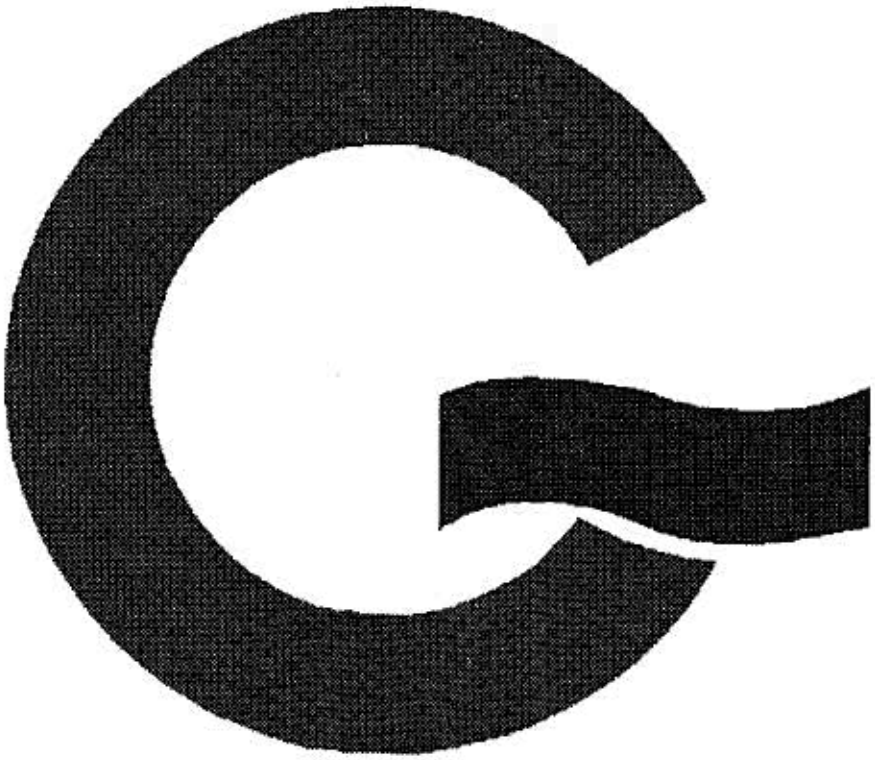
GLEDHILL SYSTEMATE 2
(London Borough of Hillingdon)

Design, Installation and Servicing Instructions

Index



SCOPE

1. These instructions should be read in conjunction with the "Installation and servicing instructions" issued by the manufacturer of the heat source e.g. a gas boiler used.

2. Any central heating installation must be in accordance with the relevant requirements of the regulations and it should also comply with the relevant recommendations of the British Standards also listed below:-

   Regulations
   - Gas Safety Regulations
   - Local Building Regulations
   - I.E.E Wiring regulations
   - Bylaws of the Local Water Undertaking

   British Standards
   BS6798, BS5449, BS5546, BS5440:1, BS5440:2, CP331:3, BS6700, BS5258 and BS7593:1992

1. A competent person as stated in the Gas Safety Regulations must install the SysteMate2 heating system. The manufacturer's notes must not be taken as over-riding statutory obligations.

2. The SysteMate 2 is not covered by the section G3 of the 1985 Building Regulations and is therefore not notifiable to the Building Control Office.

3. Although the domestic water supply to the SysteMate2 is at mains pressure, it is not necessary to fit an expansion vessel, pressure or temperature relief valve.

4. The SysteMate 2 is only suitable for use with a sealed primary i.e. central heating system.

5. The information in this manual is provided to assist generally in the selection of equipment. The responsibility for the selection and specification of our equipment must however remain that of our customer and any designers or consultants concerned with the design and installation.

   Please Note: *We do not therefore accept any responsibility for matters of design, selection or specification for the effectiveness of an installation containing one of our products.*

6. All goods are sold subject to our Conditions of Sale, which are set out at the rear of this manual.

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

8. The Gledhill SysteMate range is a WBS listed product.

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

1 DESCRIPTION

1.1 INTRODUCTION

The SysteMate 2 based heating system is schematically shown on page 8. The SysteMate 2 unit is based on an indirectly heated hot water only thermal store with integral feed and expansion cistern and is supplied with factory fitted controls and equipment as shown schematically in figure 1.2. The SysteMate 2 is designed for use in a sealed primary heating circuit to provide space heating as well as a mains pressure hot water at high flow rates and it can be used with any remotely sited boiler suitable for a sealed system.

The vented thermal store is indirectly heated by an efficient primary heat exchanger to give very fast recovery. The space heating circuit is standard and a 3-Port valve supplied with the unit can be configured to function as a diverter valve with hot water priority

An important feature of this concept is that hot water can be supplied directly from the mains at conventional flow rates without the need for temperature and pressure relief safety valves or the expansion vessels. This is achieved by passing the mains water through a plate heat exchanger (PHE), which is heated instantaneously by the primary water circulated by the pump through the PHE. The outlet temperature of the domestic hot water is maintained by a printed circuit board, which controls the speed of the pump circulating the primary water from the store through the plate heat exchanger.

A boiler of up to a maximum of about 30kW (approximately 100,000BTU/h) can be linked to any suitable model of SysteMate 2 and the deciding factor is the space heating and the hot water requirements of a dwelling.

1.2 THERMAL STORE

The copper thermal store contains primary water, which is maintained at a temperature close to the average boiler circuit temperature (approximately 70°C)

The standard version has a manually filled feed and expansion cistern. Automatic filling version with a ball valve and warning pipe connection is also available and in this case the overflow/warning pipe must be terminated at a suitable location outside the dwelling.

It is efficiently insulated with 60mm thick 'Rockwool' CFC Free insulation and cased in a steel case to minimise standing losses.

1.3 DOMESTIC HOT WATER

1.3.1 Cold Water Supply

The SysteMate 2 units are designed to be fed directly from the mains water supply as shown schematically on page 11. They fulfil the requirements of Water Bylaw 91, and therefore do not require a check valve to be fitted to the supply pipe.

The performance of the SysteMate is directly related to the adequacy of the cold water supply to the dwelling. This must be capable of providing for those services, which could be required to be supplied simultaneously, and this maximum demand should be calculated using procedures defined in BS6700.

SysteMate will operate at mains pressures as low as 1 bar and this must be available when the local demand is at its maximum, but the preferred range is between 2 and 3 bar.

As a general guideline, although a 15mm external service may be sufficient for smaller dwellings with one bathroom, a 22mm service (25mm MDPE) is preferred and should be the minimum for larger dwellings.

If a water meter is fitted in the service pipe, it should have a nominal rating to match the maximum peak demand (=hot + cold water peak demands) calculated in accordance with BS 6700. This could be up to 50l/min in some properties.

The unit must be fitted strictly in accordance with the requirements of the Local Water Undertaking who should be consulted prior to the installation. In the event of any difficulty pleases contact us as the manufacturers.

The equipment used in the system should be suitable for working pressure of 8 bar and approved by the WBS or other relevant standard.

1.3.2 Safety Fittings

It is not necessary to fit control and safety equipment normally associated with the mains pressure hot water storage appliances e.g. temperature and pressure relief valves and expansion vessel.

SysteMate is a WBS listed and a non-return valve is not required. However if the ancillary equipment fitted in the supply to these appliances require a non-return valve then the valve must be fitted directly after the branch to the drinking water i.e. a kitchen sink as shown schematicallyon page 11.

1.3.3 Domestic Hot Water Flow Rates

Provided the pipe sizing and the supply pressure is adequate the hot water flow rate should be up to 20l/min for models SP118 and SP144, up to 35l/min for models SP178,SP205 and SP238

The domestic hot water outlet temperature is regulated to 55°C by the electronic control system and is not user adjustable.

1.3.3 Use in Hard Water Areas

A patented control system prevents domestic hot water from exceeding 55°C for most of the operational times of the appliance.

It is not necessary to fit any form of scale inhibiting equipment in the domestic cold water supply to the SysteMate2

If however scale should form, the plate heat exchanger is easily isolated and replaced with a service exchange unit.

1.4 PACKAGED CONTROL SYSTEM

1.4.1 Standard Equipment

The standard configuration of the SysteMate is supplied with the following factory fitted equipment: -

a) Boiler/Space heating pump
b) Domestic hot water primary pump
c) Automatic bypass valve
d) Hot water control PCB
e) 3-Port valve
f) Primary i.e. heating circuit expansion vessel.
g) Primary circuit pressure relief valve.
h) Primary circuit pressure gauge
i) System filling loop
j) Electromechanical clock to control the space heating.

Optional equipment::-

a) Feed and expansion cistern ball valve – for automatic fill option only

1.5 ELECTRICAL IMMERSION HEATER

If an electric immersion heater is fitted then it must: -

a) Be set to operate at 80°C.
b) Be wired to a separate 13A fused and switchable power supply.

1.6 TECHNICAL SPECIFICATION

The principal dimensions of the SysteMate2 model range and the minimum dimensions for the cupboard are shown on page 6, and the technical specification of the units is given in table 1.1.

Table 1.1 Technical specification of SysteMate 2

	SP118	SP144	SP178	SP205	SP238
Overall dimensions of store (Height x diameter)	1485 x 475	1485 x 500	1500 x 550	1720 x 550	1835 x 550
Minimum cupboard size (Width x depth)	700 x 550	715 x 600	770 x 650	770 x 650	770 x 650
Primary store capacity (*l*)	100	115	145	175	190
Volume of primary coil (*l*)	2.9	3.3	4.0	5.4	6.4
Weight (kg) • Empty • Full	 48 148	 49 164	 51 196	 54 229	 58 248
Pipe connections	• All pipe connections 22mm copper • Drain connection : R½"			• All pipe connections 28mm copper • Drain: R1/2"	
Maximum working pressure • Thermal store • Heating circuit • Domestic hot water	6m – Fitted with integral feed and expansion tank 3bar – Suitable for sealed system only 5bar				
Pressure relief valve	½" – set to operate at 3 bar				
Expansion Vessel	Nominal volume of the vessel: 10 litres				
P1 / P2	Maximum permitted system volume (litres)				
0.5 / 0.5	120				
0.5 / 1.0	71				
0.5 / 1.5	38				
1.0 / 1.0	91				
1.0 / 1.5	52				
1.0 / 2.0	24				
1.5 / 1.5	64				
1.5 / 2.0	30				
Pumps • System • Plate heat exchanger	Grundfoss UPS 15-50 Grundfoss UPS 15-50			Grundfoss UPS 15-60 Grundfoss UPS 15-50	
3-Port Valve	22mm Danfoss HS3DB22			28mm Danfoss HS3DB28	
Hot water flow rate (l/min)	22	22	35	35	35
Maximum boiler size (kW)	15	20	20	30	30
Typical dwelling types • Bedrooms • Bathrooms • En-suite shower rooms	 1 – 2 1 1	 2 – 3 1 1	 2 – 3 1 2	 2 – 4 2 2	 3 – 5 2 3

NOTES

1. P1= Vessel charge pressure (bar), P2= Initial system pressure (bar)
2. The flow rates are for 35°C average temperature rise and assume normal pressure and adequate flow to the appliance.
3. All units are supplied complete with an integral feed and expansion tank which is only for the primary water in the thermal store.
4. All units are supplied with a nominal 10*litre*-expansion vessel for the boiler/space heating circuit. If the system requires additional capacity then another expansion vessel should be fitted.
5. All units are supplied with ½" Pressure relief safety valve for the space heating circuit.
6. All SysteMateIII units meet the appropriate requirements of the WMA Specification for 'Hot Water Only' Thermal Stores.

2 SYSTEM DESIGN

2.1 METHOD OF BOILER SIZING

It is only necessary to calculate the heating requirements in accordance with BS 5449. The allowance for domestic hot water (shown in table 2.1) depends upon the operating mode selected for the 3-port valve. For example; if the system is designed to operate with priority to domestic hot water then no additional allowance for hot water is required for sizing the boiler.

Table 2.1 Allowance for domestic hot water

Model	Allowance for Domestic Hot Water (kW)	
	Diverter valve mode	Flow share mode
SP118	0	2
SP144	0	3
SP178	0	3
SP205	0	3.5
SP238	0	4

The primary pipe work connecting the boiler and the thermal store should be sized to achieve maximum of 11°C rise across the boiler or the maximum temperature rise specified by the boiler manufacturer. But in any instance it should not be less than 22mm OD copper tube.

Notes:
(1) There *should be no valves or other devices in the pipe work connecting the boiler to the SysteMate 2.*
(2) The SysteMate2 is only suitable for sealed heating systems and is supplied fitted with all the appropriate components.
(3) Only boilers suitable for sealed systems i.e. fitted with over heat thermostat should be used with SysteMate2

2.2 SYSTEM TEMPERATURES

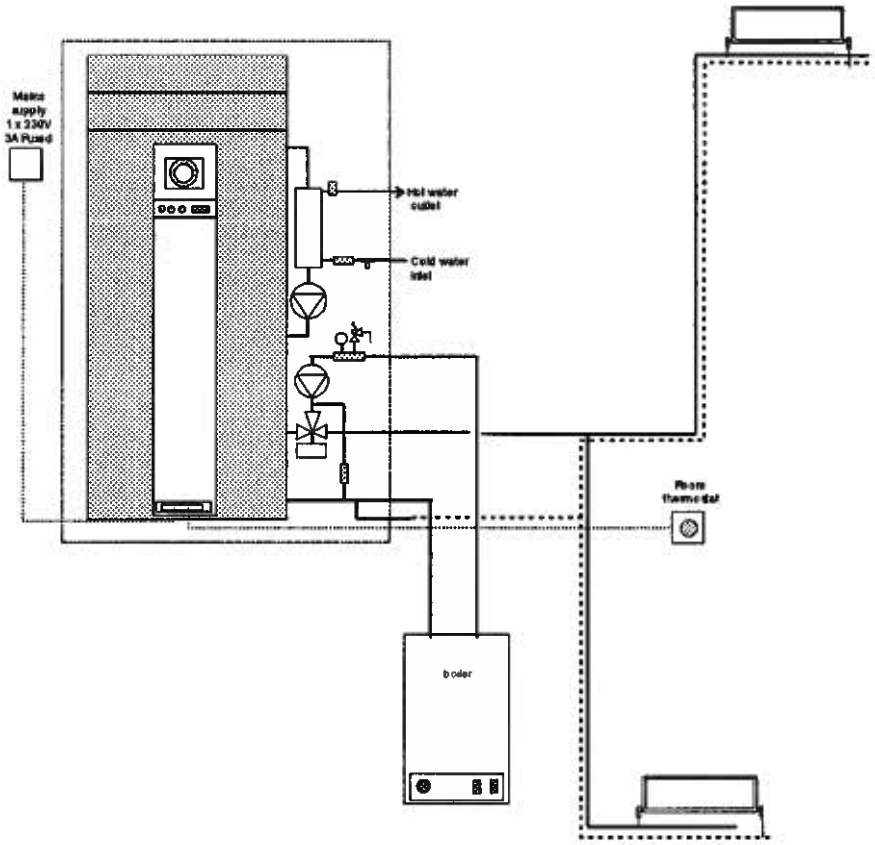
The heating circuit operates on the normal primary boiler temperatures i.e. 82°C flow and 71°C return. Therefore any traditional hot water radiators or convectors can be used with this system and no special over sizing of the heat emitters is necessary.

2.3 HEAT SOURCE – SysteMate2 SYSTEM LAYOUT

The SysteMate2 is designed to be installed with any boiler, which is suitable for a sealed heating system and the boiler must be capable of delivering hot water at minimum of 80°C. The unit is supplied with a factory fitted and pre-wired package consisting of: -

a) Boiler/Space heating pump
b) Domestic hot water primary pump
c) Automatic bypass valve
d) Hot water control PCB
e) 3-Port valve
f) Primary i.e. heating circuit expansion vessel (nominal volume 10*litres*)
g) Primary circuit pressure relief valve (Set to operate at 3 bar).
h) Primary circuit pressure gauge (0 – 4bar)
i) System filling loop
j) Electromechanical clock to control the space heating.

2.3.1 Boiler Sited Below the SysteMate 2 Unit



A typical SysteMate III Heating system with boiler below the store
- Radiators or radiator pipe work can be at higher level than the store

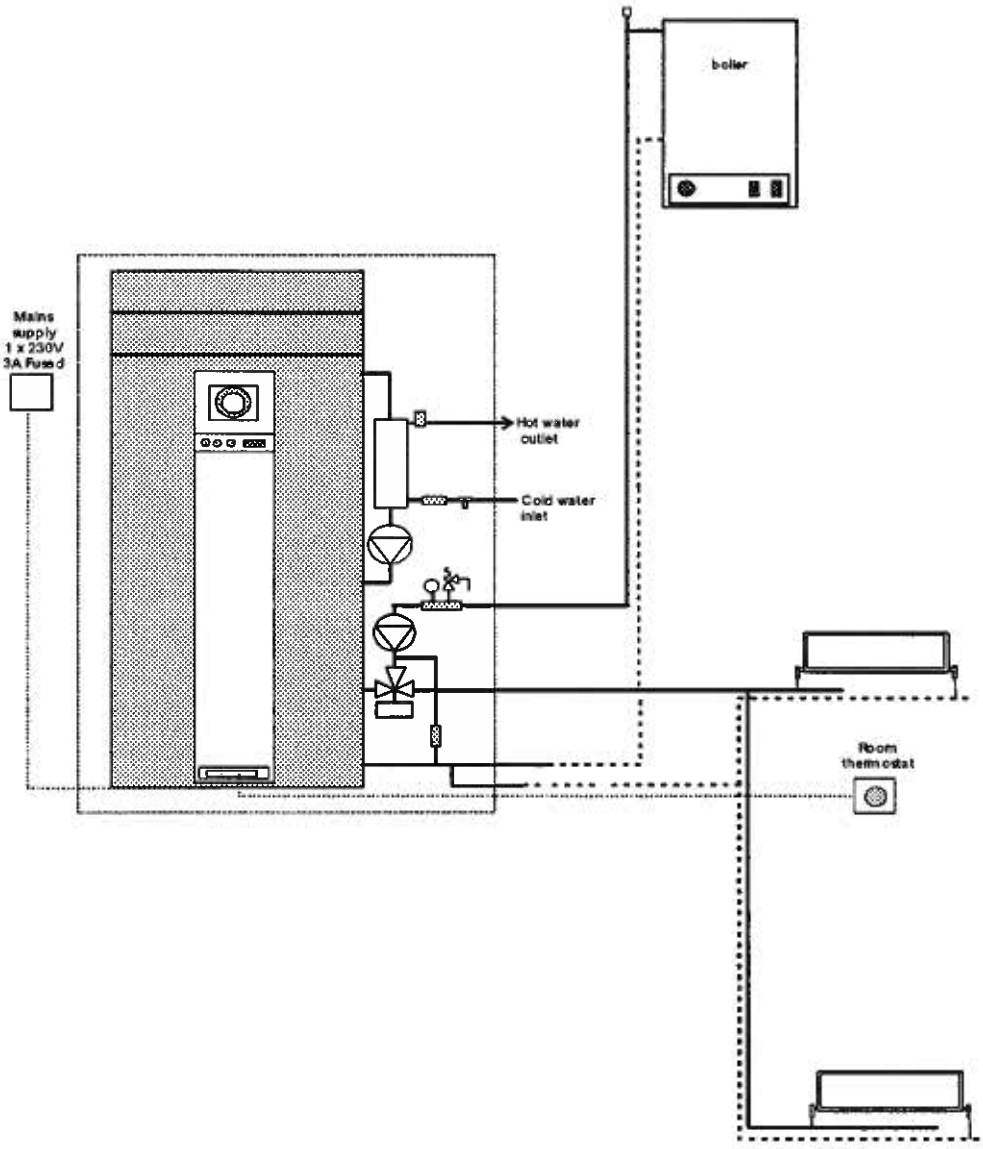
a) A typical system layout with boiler sited below the SysteMate unit and the recommended controls to give the most energy efficient operation. The flow pipe from the boiler to the SysteMate must rise continuously and NO part of the flow pipe should contain a valve or other device (which can be accidentally closed), as this forms the safety vent pipe to the pressure relief valve.
b) The pipework connecting the boiler to the SysteMate must not be less than 22mm OD copper tube or equivalent.

If the length of the flow pipe connecting the boiler to the SysteMate unit exceeds 6m , then the pressure relief safety valve must be removed from the unit and fitted to the boiler or the flow pipe adjacent to the boiler.

2.3.2 Boiler Sited Above the SysteMate2 Unit (Dipped Flow & Return)

a) A typical system layout with boiler sited below the SysteMate unit and the recommended controls to give the most energy efficient operation is shown below.

a) The pressure relief valve must be removed from the unit and fitted to the boiler or the flow pipe



A typical SysteMate III Heating system with boiler above the store
- Radiators or radiator pipe work can be at higher level than the store adjacent to the boiler.

b) NO part of the flow pipe connecting the boiler to the SysteMate should contain a valve or other device (which can be accidentally closed), as this forms the expansion pipe to the expansion vessel located inside the SysteMate 2 casing.

c) The pipework connecting the boiler to the SysteMate must not be less than 22mm OD copper tube or specified by the by the boiler manufacturer.

The boiler/SysteMate pipe circuit must be designed to prevent gravity circulation between the store and the boiler when the boiler is not firing e.g. a gravity check valve may be fitted in the boiler return pipe.

2.6 EXPANSION VESSEL REQUIREMENTS

The SysteMate is supplied with a 10-litre expansion vessel pre-charged to 1.0bar. The maximum water content of the heating system (boiler + radiators + connecting pipe work + primary coil but NOT store volume) must not be greater than those shown in table 2.2.

a) The values presented in table 2.2 are based on maximum boiler flow temperature of 93°C. The expansion vessel must be suitable to accommodate the change in volume of the water in the system when heated from 10°C to 110°C as specified in BS 5449: 1990 clause 16.2.

b) In normal circumstances initial vessel and system charge pressure of 1 – 1.2bar is suitable for most domestic properties.

c) The minimum system pressure should not be less than the static head plus 0.5bar i.e. the height of the highest point in the system above the expansion vessel plus a margin of 0.5bar.

d) If the system volume is greater than that shown in table 2.2 at the selected operating conditions then an additional expansion vessel must be fitted.

Table 2.2 the maximum recommended heating system volumes

Safety valve setting (bar)	3.0							
Vessel charge pressure (bar)	0.5			1.0			1.5	
Initial system pressure (bar)	0.5	1.0	1.5	1.0	1.5	2.0	1.5	2.0
Maximum permitted system volume (litres)	120	71	38	91	52	24	64	30

2.5 GENERAL GUIDENCE NOTES ON SYTEM DESIGN

a) The performance of the system pump and the pressure losses through the SysteMate 2 primary coil circuit are available from our technical office. The net pump head available for heating circuit can be determined from these figures and this net pump head should be used for sizing the heating circuit pipework.

For example: *At 0.5 l/s primary flow rate, the pressure loss through the SysteMate model SP238 (coil+fittings+3-port vale) is 12kPa and the maximum pump head available at 0.5 l/s and setting 3 is 32kPa (3.2m WG). Therefore 20kPa is available for the boiler circuit.*

b) If the boiler is fitted at a higher level than a SysteMate then it may be necessary to fit a gravity check valve in the primary circuit to prevent reverse circulation during dormant period.

c) All units come complete with their own feed and expansion tank for the primary water in the store, which is used for generating hot water only. The water level in this tank should be adjusted to the level mark.

d) The SysteMate is only suitable for a sealed heating system and therefore heating circuit pipework can run at higher level than the store e.g. to cross the doorway etc.

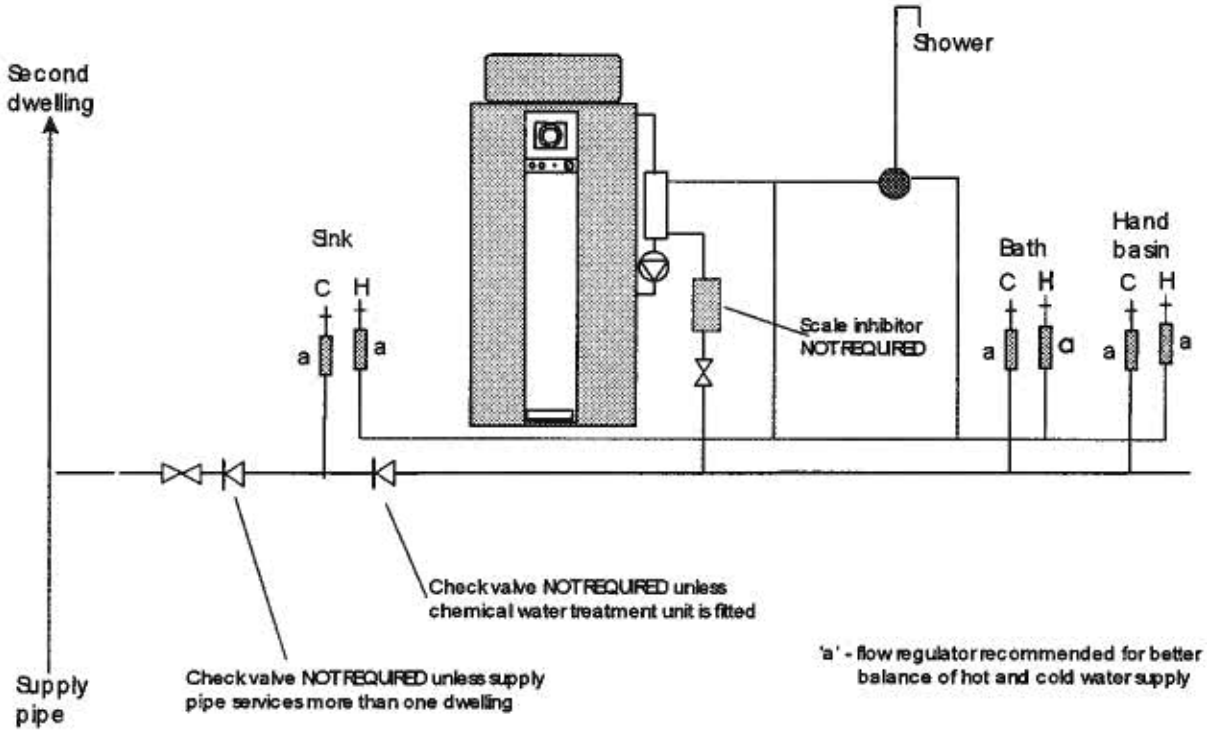
e) The overflow /warning pipe should be installed in material suitable for the heating system feed and expansion cisterns in accordance with BS 5449.

f) An automatic bypass is fitted on the heating circuit to compensate for pressure i.e. flow rate changes in the heating circuit e.g. when the thermostatic radiator valves close. The system does not require any other bypass valves on the boiler circuit.

g) There shall be no permanent connection to the mains water supply for filling the system, even through a non-return valve without the approval of the Local Water Authority. An approved filling loop is supplied with the SysteMate and this should be disconnected after filling the system.

2.6 HOT AND COLD WATER SERVICES

A schematic layout of the hot and cold water services in a typical small dwelling is shown below:-



Typical hot and cold water distribution network

.6.1 Taps and Valves

a) The hot and cold water taps and the mixing valves used with SysteMate must be suitable for operating at 8 bar pressure.

b) Aerated taps are recommended to prevent splashing.

2.6.2 Pipe Sizing

To achieve even distribution of the available supply of hot and cold water, it is important in any mains pressure system that the piping in a dwelling should be sized in accordance with BS6700. This is particularly important in a large or a property with more than one bathroom. However the following rule of thumb guide lines should be adequate for most typical property types: -

a) A 15mm copper or equivalent external service may be sufficient for smaller 1 bathroom dwelling (depending upon the flow rate available), but the minimum size for larger dwellings must be 22mm (25mm MDPE).

b) The internal cold feed from the main stop tap to the SysteMate should be run in 22mm pipe. The hot draw-off should also be run in 22mm as far as the branch to the bath tap.

c) The tee-offs to the hand basins and sinks should be in 10mm and to the shower in 15mm.

d) The tee-offs to taps in existing properties, which are in 15mm, ***should be restricted*** to balance the flow to each outlet.

Best results for balanced system are achieved by fitting appropriate flow regulators to each hot and cold outlet

2.6.3 Showers

a) Showers with either thermostatic or manual mixing valves can be used as long as both the hot and the cold are mains fed. However the thermostatic valves will provide better control.

b) The hot water supply to a shower mixing valve should be fed directly from the SysteMate and where practical should be the first draw-off point on the hot circuit.

c) The cold supply to a shower mixing valve should be fed directly from the rising mains via an independent branch.

d) ***Fixed head type showers:*** No anti-syphonage arrangements are necessary.

e) ***Loose or Flexible head type showers:*** If a loose head shower with a flexible hose is used over a bath then: -

- The hose must be fixed so that the head cannot fall closer than 25mm above the top edge of the bath as specified in the Byelaw 16 of the Water Supply Byelaws.

Or

- The shower must incorporate or be fitted with an anti-syphonage device at the point of flexible hose connection.

2.6.4 Bidets

a) The supply of hot and cold mains water directly to the bidet is permitted provided that it is of the over-rim flushing type and that a type 'A' air gap is incorporated.

b) It must not include either an ascending spray or provision to attach a hand spray.

3 INSTALLATION INSTRUCTIONS

3.1 IMPORTANT NOTES

a) Only boilers suitable for sealed i.e. closed heating systems and fitted with additional safety thermostat must be used with SysteMate 2

b) For good hot water service, the thermal store must be charged to at least 70°C. Therefore the boiler selected must be able to deliver hot water at 82°C.

c) It is recommended that the surface pipework in the SysteMate cupboard ***must be insulated*** to reduce the standing losses and to prevent unnecessarily high cupboard temperatures. More heat is lost from the first metre of pipework than from the store.

d) Not withstanding the above, the cupboard temperatures are normally higher than in a conventional system and therefore the design of both the cupboard and the door should take this into account.

e) The system operates on the normal primary flow and return temperatures of the boiler just like in a traditional heating system with indirect vented cylinder (i.e. 82°C flow and 71°C return) and therefore traditional hot water radiators or convectors can be used with the system.

f) All SysteMate models are for the sealed primary i.e. closed systems only.

3.1.2 Plumbing Connections

a) Make all water connections in accordance with the labelling on the thermal store and the associated pipework.

b)

c) If a boiler is fitted above the thermal store, and there is a risk of gravity circulation then gravity check valve should be incorporated in the connecting pipework leading from the SysteMate to the boiler i.e. the boiler return.

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

3.1.3 Thermal Store Feed and Expansion Cistern

a) It is most important to adjust the fitted ballvalve (if fitted) whilst the system is cold to give a water level of 50mm above the feed outlet to the primary system. This is to allow adequate room for expansion, which is marked by a corrugation in the wall of the tank.

b) Sufficient space should be left above the unit to allow access to the ballvalve for servicing and adjustment.

c) A 22mm compression fitting is provided as standard in the feed and expansion cistern for the overflow/warning pipe, which should be no less than 20mm internal diameter.

d) In a manually fed feed and expansion cistern, the overflow should be fitted to discharge at a suitable location inside a dwelling.

e) In an automatically fed feed and expansion cistern (i.e. fitted with ball valve) the overflow pipe should be fitted to discharge clear of the building and be sited so that any overflow can be easily observed.

f) The overflow/warning pipe should be installed in either high temperature uPVC or copper and should not have any other connections to it.

3.1.4 Domestic Hot Water Temperature

The electronic control system automatically regulates the domestic hot water outlet temperature to 55°C and no adjustment or setting is necessary during installation.

This temperature has been selected to minimise chances of scaling and to reduce wastage of hot water energy.

3.1.5 The Boiler Thermostat

This should always be set to ***maximum*** to give the best hot water and heating service and to achieve the highest efficiency by reducing boiler cycling because the store thermostat will then be controlling the boiler.

3.1.6 Pump Settings

a) The boiler/system pump should be set at speed at which the temperature difference across the boiler is not greater than 11°C i.e. the nominal design parameters. The performance of the pump is shown in figure 2.3.

b) The domestic hot water plate heat exchanger pump should always be set at maximum speed.

3.2 GLEDHILL SYSTEMATE INSTALLATION IN TEN EASY STEPS

The SysteMate2 installation is easier and quicker than conventional vented system because there is no secondary feed and expansion tank to install and no time is wasted in planning and installation of the controls and pumps in the cylinder cupboard.

Inspect the position in which SysteMate is to be fitted and check that the internal depth is at least 600mm and the width is 700mm for models SP118 and 750mm for models SP144,SP178, SP205 and SP238 (See table 1.1)

a) Plan the pipe connections. Each fitting on the SysteMate has its own label. You need to connect the following pipes: -
   - Pumped flow and return pipes from the body of the SysteMate to the radiators.
   - Pumped flow and return pipes from the body of the SysteMate to the boiler.
   - Cold mains water supply connections to the inlet side of the plate heat exchanger and to the ball valve in the F & E cistern if it is not manual fed type.
   - Domestic hot water supply pipe from the plate heat exchanger outlet to the taps.
   - Overflow warning pipe from the F & E cistern to discharge in a conspicuous position externally if fitted with a ball valve (AutoFill version) or terminated at suitable position inside a dwelling if it is manual fill type (i.e. not fitted with a ball valve).

a) Decide at what stage in your installation work you are going to fit the SysteMate. We would suggest that the SysteMate should be fitted first and the pipes run from it to the boiler, radiators and domestic hot water supply system subsequently in that order.

b) Remember that the automatic bypass is already fitted and no additional bypass should be fitted in the system.

c) Carryout the rest of the installation work, i.e. boiler radiators and hot water supply pipework. Connect the cold water supply pipework.

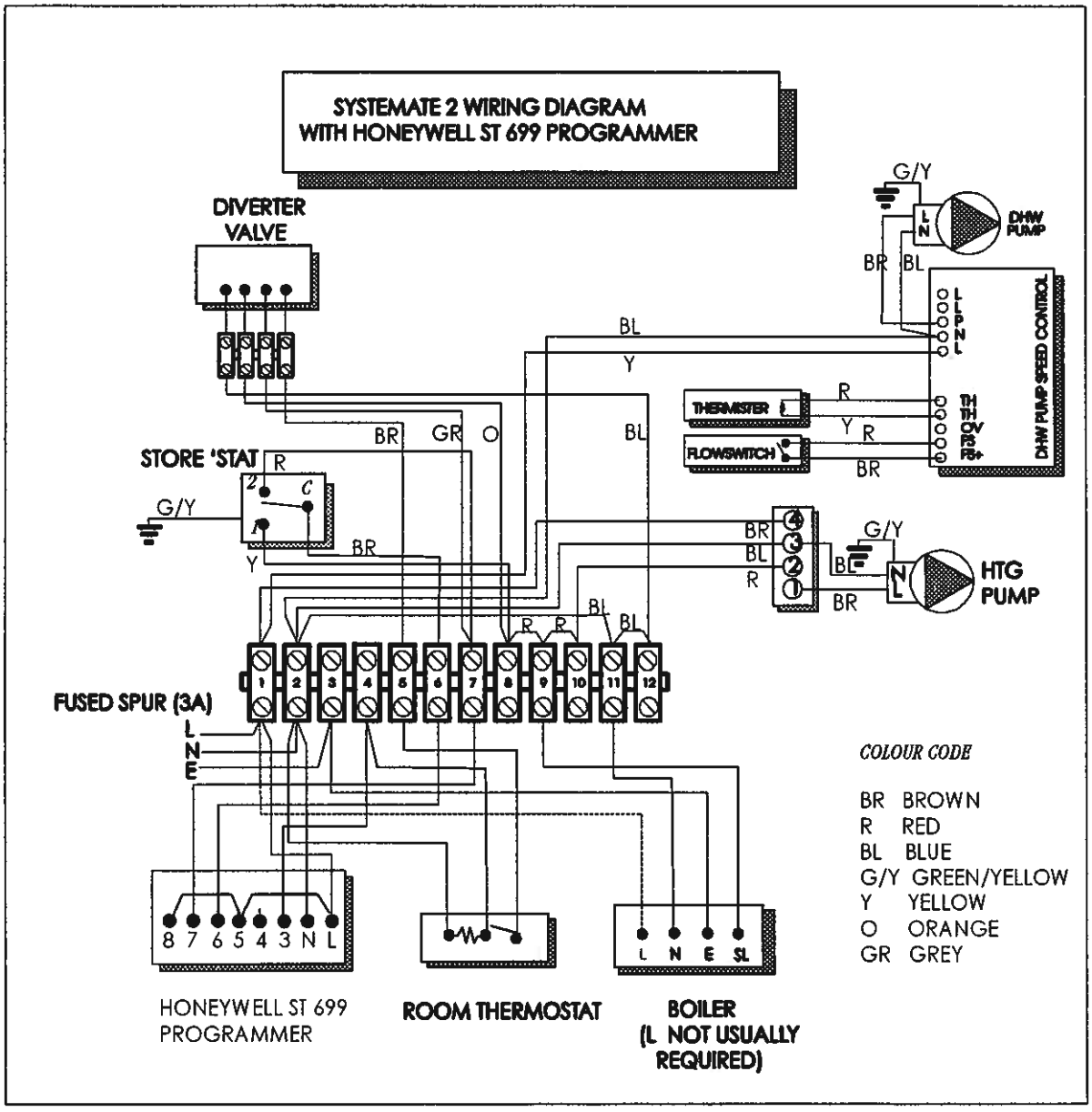
d) Fill the radiators, boiler and pipework with water through the filling loop so that when cold, the pressure gauge shows approximately 1 bar for a typical system. Flush the system out, fill and vent again.

e) Open the domestic hot water isolating tap and establish flow through the taps etc. Check that the flow through all hot and cold water taps etc. is stopped when the mains water stop tap is closed.

f) Fill the thermal store so that when cold, the water is level with the line swage in the cystern.

a) The system is now requires to be electrically connected.

3.3 WIRING THE SYSTEM (mid position 3 port valve)



Note: *Do not attempt the electrical work unless you are competent to carry it out to the* IEE regulations

3.3.1 Fused Isolator

a) Connection to the electrical supply must allow complete electrical isolation by installing a double pole switch having a 3mm separation on both sides.

b) The isolating switch must only serve the SysteMate space heating and hot water system together with its controls and the boiler.

c) The supply to the SysteMate must be fused at 3A.

3.3.2 To Wire the SysteMate

Before commencing, ensure that the power source to which the SysteMate is to be connected is isolated. The generic wiring procedure for the SysteMate is described below .

a) Remove the white cover plate (4 screws).

From 3A fused and switched connection unit bring a live, neutral and earth to the Systemate terminal block.
'Live' to terminal '1'
'Neutral to terminal '2'
'Earth to terminal '3'

b) Wire the boiler to the SysteMate terminal block as follows: -
- Take a 'Live' from the SysteMate terminal '9' to boiler 'Switched Live' terminal.
- Take a 'Neutral' from the SysteMate terminal '11' to the boiler 'Neutral' terminal.
- Take an 'Earth' from the SysteMate terminal '3' to the boiler 'Earth' terminal.
- If the boiler requires permanent live other than for a pump over-run, then this should be taken from terminal '1' on the SysteMate.

a) The link between SysteMate terminals '4' and '5' should be removed if a room thermostat is to be fitted (see section 3.3.3).

When the wiring is complete, replace the front panel.

3.3.3 To Wire the Room Thermostat

a) Remove the link joining the SysteMate terminals '4' and '5'.

b) From the SysteMate terminal '4' take a 'live' to the 'live connection' on the room thermostat.

c) From a room thermostat 'switched live' connection take a 'live' to SysteMate terminal '5'.

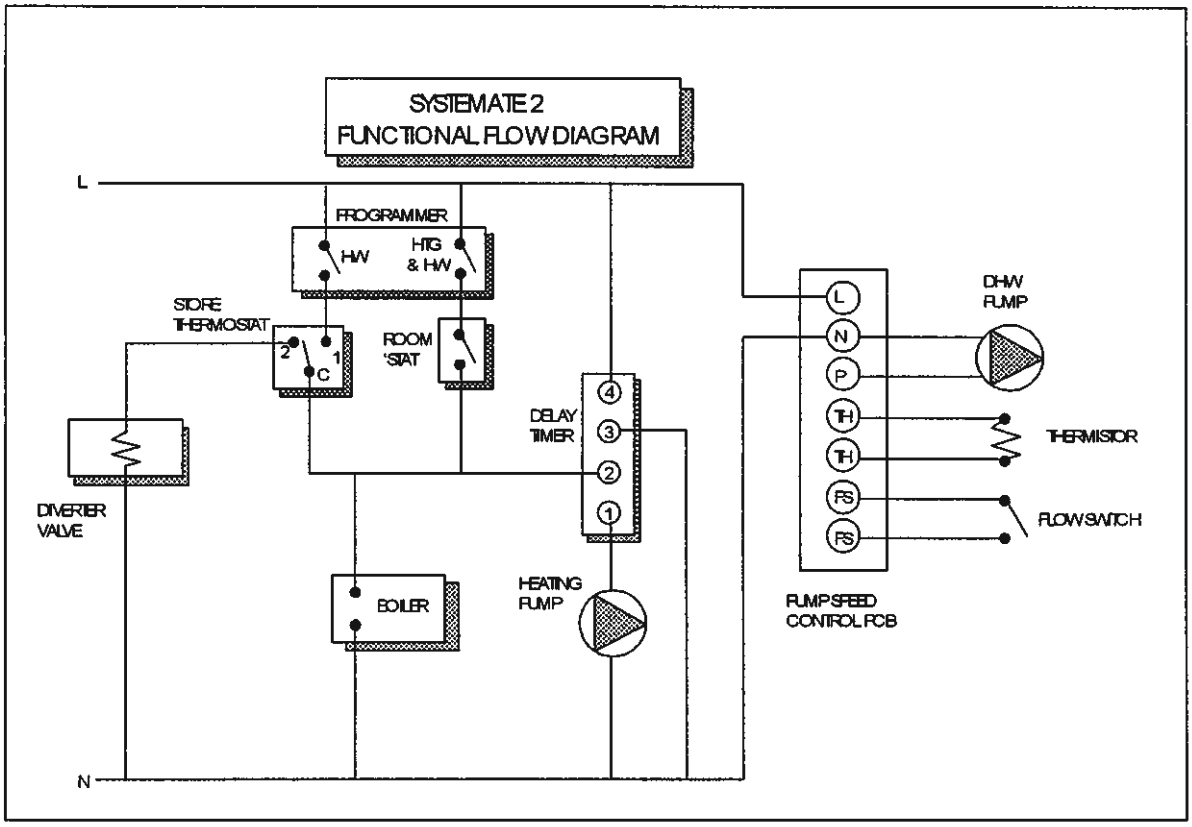
d) Connect the SysteMate terminal '2' to the room thermostat 'Neutral' terminal.

e) If required, connect the SysteMate terminal '3' to the room thermostat 'Earth' terminal.

3.3.4 Frost Protection

a) When a frost protection is required for the whole house or where a base temperature is required during cold weather, then a frost thermostat should be wired across SysteMate terminals '1' and '4'.

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



4 COMMISSIONING THE SYSTEM

It is essential that the system function 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 BS6798, BS5449 and BS7593: 1992.

4.1 INITIAL FILLING AND CLEANSING THE SYSTEM

a) Ensure that if the ball valve is fitted that the float is correctly adjusted to close the ballvalve at the water level line inside the F & E cistern.

b) Check and adjust the expansion vessel air pressure if necessary to the initial charge pressure of 1.0bar or to a figure specified by the designer.

c) Fill the thermal store through the feed and the F & E cistern and flush cold.

d) Open any isolating valves and fill the heating system i.e. boiler and radiator circuits using the filling loop and flush cold.

e) Refill both the primary store and the heating system and purge air.

f) Add a suitable proprietary cleanser to ensure that flux residues and installation debris are removed from the system.

g) Commission the boiler.
   - If the boiler is range rated, then adjust it to the ***specified*** or ***maximum*** heat input.

- Set the boiler/system pump speed so that the temperature difference across the boiler is ***not more than 11°C.***
- Set the boiler thermostat to ***maximum.***

a) To ensure full cleansing, the circulation to all parts of the system should continue for a minimum of 1 hour.

b) Flush both the primary store and the heating system hot, having checked that there is no overflow or the system pressure was not greater than 2.5bar when the system was up to temperature.

c) Refill both the systems i.e. thermal store and the heating system.

4.1.2 Primary Water Treatment

a) Although the standard SysteMate has no special water treatment requirements, the radiators and other parts of the circuit will benefit from the application of an efficient scale and corrosion inhibitor

b) Please remember that if water treatment is applied then it must be injected separately in to the thermal store (via the feed and expansion tank) and in to the heating circuit which is pressurised.

4.1.1 Testing the controls

The store thermostat is factory set to control the primary water temperature at 70°C.

a) With the central heating off, let the store heat up (with a 10kW i.e. 30,000Btu boiler it will take about 25mins). Switch on space heating and check that the space heating controls e.g. programmer, room thermostat are functioning correctly.

a) Establish that the temperature difference across the boiler is not greater than 11°C or the value specified by the designer. If the difference is greater than this value then check: -

- System/boiler pump speed setting.
- For air in the boiler pipework – vent if necessary.
- Pipe sizes

4.1.4 Commissioning the Domestic Hot Water Outlet Temperature

The domestic hot water outlet temperature is factory set at 55°C and it is independent of the store charge temperature and the hot water flow rates. Therefore no onsite adjustment is necessary or recommended.

4.2 IMPORTANT DO'S AND DON'TS

a) **DO** check that the incoming mains water pressure. The preferred range of mains pressure is 2 – 3bar.

b) **DO** check that all connections are in accordance with the labelling on the thermal store.

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

d) **DO** make sure that there is adequate clearance above the F&E tank to service the valve if fitted.

e) **DO** ensure that the range rated appliances are set at ***output*** specified by the designer.

f) **DO** insulate any exposed pipework in the SysteMate cupboard.

g) **DO** plumb the overflow / warning pipe in 20mm internal diameter pipe to discharge in conspicuous external position, using high temperature uPVC or copper.

h) **DO** check the pump settings.
- The boiler/system pump to give temperature difference across the boiler 10°C or less.
- The hot water plate heat exchanger pump should be set at ***maximum.***

a) **DON'T** use pipe smaller than 28mm between the boiler and the SysteMate when the boiler rating exceeds 20kW (66,000 Btu/h).

5 PROBLEM SOLVING

5.1 FAULTS AND THEIR CAUSES

Any fault in the system design and malfunction of system components will generate customer complaints. These complaints can be grouped into the following three main categories: -

a) The system is noisy
b) Hot water service is unsatisfactory
c) Space heating service is unsatisfactory

5.1.1 Causes of a 'Noisy' System

a) Noisy pump operation
- Check the level of water in the F&E cistern – refill and vent if necessary.
- Check the pressure in the heating system, which should not be less than 1.0bar when cold – refill and vent if necessary.
- Check the pump speed setting of the system/boiler pump – Reduce if necessary but ensure that the temperature rise across the boiler does not exceed 11°C.
- Cavitation on account of insufficient static head on the suction side of the pump – see system design guide lines.
- If system is noisy when in heating mode – check and adjust if necessary the system bypass valve.

a) Noisy boiler operation
- Check the flow rate through the boiler at full gas rate by measuring the temperature rise across the boiler. If the temperature rise is 11°C or less then contact the manufacturer. If the temperature rise is greater than 11°C, then increase the pump speed.
- Check pressure of water in the system – refill if necessary to 1.0bar when cold.
- Check and vent the system if necessary.
- Check and adjust the automatic bypass valve if necessary.

a) Noise when hot water tap is opened
- If the pump is noisy when the hot water tap is opened, then check level of water in the F&E cistern and vent the pump if necessary.
- Water hammer – loose pipe work and/or tap washers.

5.1.2 Causes of 'Unsatisfactory Hot Water Service'

a) Check boiler thermostat – this should be set at maximum.

b) Check that the boiler flow temperature before it is switched off by its internal thermostat is adequate – It should not be less than 80°C.

c) Check that the store is charging to at least 70°C – If not then recommission.

d) Check that the hot water plate heat exchanger pump stops and starts when the hot water tap is opened and closed.

e) Check that the plate heat exchanger pump is set at maximum speed.

f) Check that the hot water outlet temperature does not change significantly when the hot water flow rate is increased from (say) 5l/min to 15l/min.

g) Check that the filter before the flow switch is not blocked – Clean if necessary.

h) Check that the space heating load is not greater than the boiler output and that the SysteMate model is suitable for the type of dwelling.

i) If 'a' to 'h' are correct then it is likely that the performance of the heat exchanger is impaired by scale. Replace it with a factory exchange unit.

5.1.3 Causes of 'Unsatisfactory Space Heating'

a) Check boiler thermostat – this should be set at maximum.

b) Check that the boiler flow temperature before it is switched off by its internal thermostat is adequate – It should not be less than 80°C.

c) Check the operation and the settings of the heating programmer and the room thermostat.

d) Check that the 3-port valve is functioning and that the system/boiler pump is circulating the water to the radiator circuit.

e) If some rooms are not being heated properly, then increase the pump speed and if necessary balance the system.

5.1.4 Overflow From Feed & Expansion Cistern

a) Check that the controlled level of water in the cistern is no higher than the indentation mark. Adjust if necessary.

b) If replacement ball valve is required, then this should be obtained only from Gledhill Water Storage Ltd.

5.1.5 Discharge from the Pressure Relief Safety Valve

a) Check that the system is not over pressurised when cold – Nominal charge pressure should be about 1.0bar.

b) Check that the air pressure inside the expansion vessel is correct – Refill with air if necessary to nominal value of 1.0bar.

c) Check that the expansion vessel is correctly sized for the system volume.

d) Check the pressure relief valve seat – replace if necessary.

Gledhill (Water Storage) Ltd

AMD. MAY 2007

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 four 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 may be 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 or European 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 (f) 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.**

(a) **Domestic and Commercial Open Vented Cylinders and Tanks.**

The copper storage vessel is guaranteed for ten years and if it 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.

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

(ii) 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.

(b) **Domestic Mains Fed Products (Primary Stores)**

The copper storage vessel is guaranteed for five years and if it 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).

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

(ii) 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.

(c) **Integrated Boiler and Storage Vessel Products and Stand Along 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.

(d) **Stainless Steel Unvented Cylinders**

Gledhill guarantee the components including controls, valves and electrical parts for two years from the date of purchase. IT SHOULD BE NOTED THAT THE FACTORY FITTED TEMPERATURE AND PRESSURE RELIEF VALVE MUST NOT BE REMOVED OR ALTERED IN ANY WAY OR THE GUARANTEE WILL NOT BE VALID. GLEDHILL WILL NOT BE RESPONSIBLE FOR ANY CONSEQUENTIAL LOSS OR DAMAGE HOWEVER IT IS CAUSED.

The guarantee for the stainless steel vessel is for twenty five years if the original unit is returned to us AND PROVIDED THAT:

(i) It has been installed as per the Design, Installation & Servicing Instructions, relevant standards, regulations and codes of practice.

(ii) It has not been modified, other than by Gledhill.

(iii) It has not been subjected to wrong or improper use or left uncared for.

(iv) It has only been used for the storage of potable water.

(v) It has not been subjected to frost damage.

(vi) The benchmark log book is completed after each annual service.

(vii) The unit has been serviced annually.

It should be noted that the guarantee does not cover:

- the effects of scale build up
- any labour charges associated with replacing the unit or parts.

If the stainless steel vessel 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, Scotland and Wales (excluding all islands):

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

(ii) thereafter at a charge of one twenty fifth of the then current list price during the second year after delivery by us and increasing by a further one twenty fifth on the second and subsequent anniversary of delivery by us.

ACTION IN THE EVENT OF FAILURE

If the Stainless Lite develops a leak we will ask for a deposit against the supply of a new one. This will be refunded if the failure is within the terms of the warranty when it has been examined by us.

(e) **Solar Panels and ancillary equipment**

Gledhill provides a five year warranty for defects in the collectors (except broken glass and collector accessories eg metal edgings). If the collector demonstrably fails to meet one of the requirements of the standard DIN 4757 part 3 we will replace it free of charge based on the date of invoice. We can not be responsible for damage caused by mechanical stress and/or changes caused by weather related influences. The warranty excludes minor surface damage that does not affect performance or malfunction due to improper assembly or installation.

Please note:

- Installation must have been carried out by a licensed specialized company (heating contractor or plumber) following the version of installation instructions in force.
- Gledhill or its representative was given the opportunity to check complaints on site immediately after any defect occurred.
- Confirmation exists that the system was commissioned properly and that the system was checked and maintenance was performed annually by a specialised company licensed for this purpose

(f) **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 two years 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 Purchasers domestic water system.
(g) **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 (a) - (f) 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.

10. LOSS OR INJURY
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.

11. 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.

12. 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.

13. 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.

14. 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.

15. 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.

16. 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.

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