



Instructions & Maintenance  
**FLOWTHERM**

Issue 1

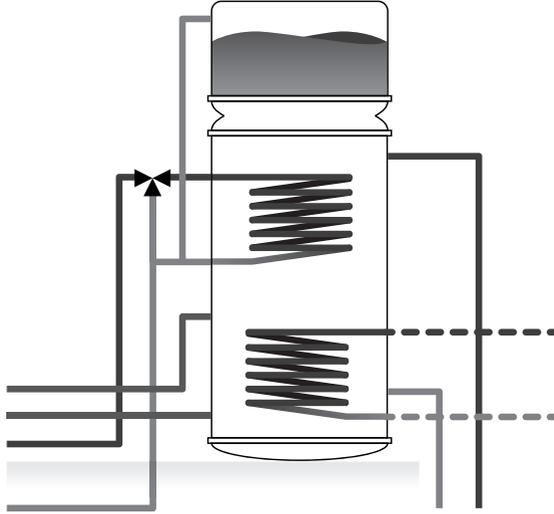
## IMPORTANT

### SAFETY REGULATIONS

These instructions should be read in conjunction with those from the boiler manufacturers and other system components. FlowTherm must be installed in accordance with the relevant requirements of the Local Building Regulations, Building Standards (Scotland) Regulations, Current IEE Wiring regulations, Health and Safety Document 635 "The Electricity at Work Regulations 1989, Local Water Bylaws, BS6700 and BS5449.

### DESCRIPTION

FlowTherm is a vented primary water thermal storage unit that supplies mains pressure domestic hot water at good flow rates in accordance with the requirements of BS 6700.



### HOW THERMFLOWS WORK

FlowTherm differs from the conventional cylinders in that the water stored in the FlowTherm is not the same water that comes from your taps. It should be thought of as a store of heat. This heat store is typically maintained at 70 – 80°C dependanton model.

A 50mm thick layer of CFC free foam insulation keeps heat loss to a minimum. Inside every FlowTherm is a heat exchange coil which uses specially designed finned copper tubing. Mains pressure cold water is heated instantaneously as it passes through this coil.

Hot water can leave this coil at over 60°C. A thermostatic mixing valve (factory set at 55°C non user adjustable) ensures water is delivered at a safe temperature. The store is vented via a feed and expansion tank. Only the inside of the coil is at controlled mains pressure.

FlowTherm electric units are heated by two immersion heaters and provide hot water only. Boiler models are heated by gas or oil boilers and in addition to hot water can also provide heat directly to space heating (typically radiators ).

### MODEL TYPES AVAILABLE

#### COMBINATION UNIT

These units have an integral pre-plumbed primary feed and expansion cistern capable of accommodating expansion from up to 40L of primary water over and above that of the stored volume. It is normally supplied with a float operated valve and warning pipe (overflow) connection. Combination units eliminate all water tanks from the roof space.

#### CYLINDER UNIT

This unit is often used on retro-fit situations where an existing feed and expansion tank is already present or where there are difficulties an achieving the minimum head requirement recommended by the boiler manufacturer. Standard FlowTherm cylinder units are suitable for a maximum static head of 10m but other models are available.

## HEATING STYLES AVAILABLE

### STANDARD BOILER MODELS (INTEGRATED STORE)

The perfect partner for your gas or oil boiler FlowTherm boiler models provide balanced mains pressure hot water and fast response radiators all form the store. Provision for an immersion heater gives a back up heat source.

When installed in the double pump format the system can be considered as being split into two circuits. In the boiler circuit the store thermostat (typically set at 75°C) controls the boiler to maintain the store at the correct temperature. When the room thermostat calls for heat the space heating pump circulates heat to the radiators.

### SEALED SYSTEM PRIMARY (HOT WATER ONLY STORE)

As the name suggests these models allow the primary system to be sealed (3.5 bar max on the standard units). The sealed system allows the radiators to be positioned above the FlowTherm unit.

SSP models are plumbed in like conventional indirect cylinders. SSP units provide hot water only as space heating is supplied directly from the boiler usually via a diverter valve. This has two benefits. Firstly it allows a lower store temperature (typically 70 °C) to be used. Secondly SSP units can be coupled with much larger boilers and space heating loads than with standard FlowTherm models.

Usually supplied in the combination tank the top tank keeps the unit topped up as water is lost by natural evaporation.

### SEVEN PLUS ELECTRIC MODELS

The FlowTherm 7+ Electric model is designed to make the best use of cheap rate electricity from the wide variety of tariffs available such as Economy 7 or 10. The lower of the two immersion heaters is usually connected to the cheap rate supply and the upper one provides a boost facility for times when you need to reheat the unit but cheap rate electricity is not available.

The immersion heaters we supply are manufactured to the Maxistore specification. They are a low noise type so as not to disturb anyone when the unit is heating during the night.

Electric units provide hot water only, space heating is not fed from the store.

### CENTRAL BOILER MODELS

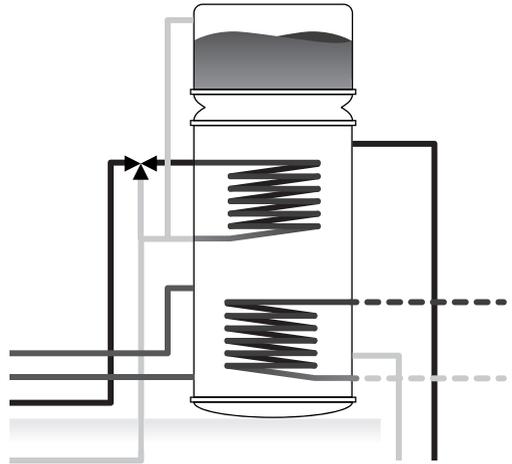
FlowTherm is the ideal partner for a central boiler plant. Installed in each property it allows for single metering of hot water usage and is economical system in terms of installation and running costs. Usually based around the SSP versions, we can custom design units to suit your requirements.

### MULTIPLE HEAT SOURCES

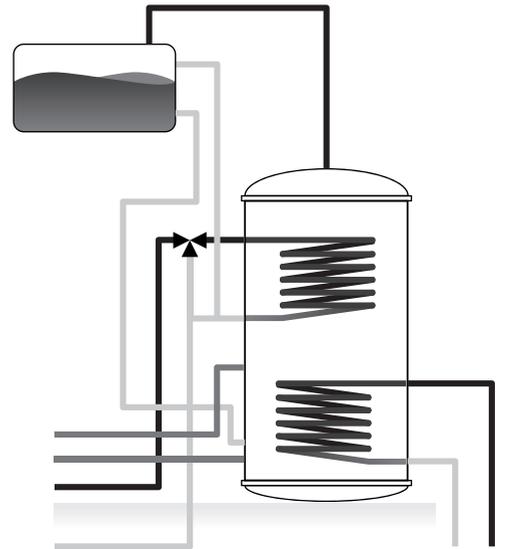
FlowTherm thermal stores form the ideal basis for a system with multiple heat sources. Fire back boilers, Solar heating and Solid fuel stoves (Aga's, Rayburns etc.) can all be coupled up alongside the usual boiler or immersion heaters.

Boiler models have two spare bosses as standard, which can be used. With Electric and SSP variants the bosses are not standard but are fitted as an optional extra.

### COMBINATION STYLE UNIT...



### CYLINDER STYLE UNIT...



## SPECIFICATION AND SELECTION GUIDE

FlowTherm models cater for applications ranging from the smallest flat to a 4-6 bed, two bathroom property.

Model	Capacity	Domestic Hot Water Design Flowrate (l/min)	Maximum Recommended Radiator Load (kW)	Typical House Size	Typical Hot Water Requirements
<b>Electric Models</b>	160	18	Hot Water Only	1 Bed	Bath & Overbath Shower
	180	20		2 Beds	Bath & Overbath Shower
	210	22		3 Beds	Bath & Ensuite
<b>Boiler Models</b>	120	14	3kW	1 Bed	Shower
	140	15	6kW	1-2 Beds	Bath
	160	18	9kW	2-3 Beds	Bath & Ensuite
	180	20	13kW	3-4 Beds	Bath & Ensuite
	210	22	17kW	4-5 Beds	Upto 2 Standard Baths
<b>SSP Models</b>	120	15	N/A	1-2 Beds	Bath
	140	18		2-4 Beds	Bath & Ensuite
	160	19		3-4 Beds	Bath & Ensuite
	180	20		3-5 Beds	Bath & Ensuite
	210	22		4-6 Beds	Upto 2 Standard Baths

The 210 Litre size meets the NHBC requirements for two bathroom properties when one bath is drawn after the other.

The 210 Litre size is recommended when you are connecting to a solid fuel appliance.

### DIMENSIONS: COMBINATION UNITS

Model	Height	Diameter Unlagged
120L	1150	450
140L	1300	450
160L	1450	450
180L	1600	450
210L	1850	450

### DIMENSIONS: CYLINDER UNITS

Model	Height	Diameter Unlagged
120L	900	450
140L	1050	450
160L	1200	450
180L	1370	450
210L	1500	450

### DIMENSIONS: COMBINATION UNITS

The basic vessel is supplied with a kit of the following components. These models are supplied unboxed and the kit of parts is loose in a bag

	Boiler Models Combination Type	Boiler Models Cyinder Types	Electric Models Combination Types
Thermostatic Blender	yes	yes	yes
Expansion Vessel	yes	yes	yes
Ball Valve & Copper Float	yes	no	yes
Thermostat (Pocket Type)	yes	yes	no
Immersion Heaters	yes	yes	yes
Isolation Valve	yes	yes	yes
Pressure Reducing Valve	yes	yes	yes

## **WATER SUPPLY**

It is essential that the mains water supply pressure and flow availability is capable of meeting both hot and cold water services demand. FlowTherm is capable of delivering upto 22 litres / min of hot water with an inlet pressure of 2 bar.

All installations require a 3.0 Bar pressure reducing / control valve. FlowTherm is not recommended for use where the mains pressure is below 1.0 bar.

Unless consistently high mains pressure are available, it is unlikely that a mains service pipe of less than 22mm OD (copper) or 25MM OD (Blue MDPE) will provide an adequate flow rate to the system.

A full bore isolating valve (e.g. quarter turn valve) should be fitted in the supply before, but adjacent to, the unit. It is recommended that a 22mm draw-off is provided to the bath hot tap. 15mm or smaller pipes can then be used to supply hot water services to the other individual terminations to give a balanced distribution system.

## **TERMINAL WATER FITTINGS**

### **TAPS**

Ensure that all terminal fittings will withstand mains pressure.

### **SHOWERS**

Because of the draw-off profile, thermostatic shower mixers are recommended to optimise performance; these must be suitable for mains pressure. Where it is possible for a flexible shower handset to reach below the bath spillover level compliance with the Water Bye-laws is essential.

### **USE IN HARD WATER AREAS**

In areas where temporary hardness exceeds 200mg/L, treatment of the mains water supplied to the appliance is recommended to maintain its performance. An in line scale reducer (conditioner) or ion-exchange softener will be most effective when fitted immediately before the unit.

A good quality polyphosphate dosing device can inhibit scale build up. They are most effective when fitted immediately before the FlowTherm but if you intend to fit in the same compartment as the FlowTherm care must be taken to ensure that the dosing unit is not subjected to high ambient temperatures as excessive heat will impair performance. Section 6 gives advice on prevention of excessive cupboard temperatures.

In hard water areas it is also recommended that an anti-scalant is added to the primary system during commissioning and allowance should be made for the full volume of primary water. Consult BS7593 and boiler manufacturers instructions.

## **SYSTEM DESIGN**

### **CHOICE OF BOILER**

FlowTherm is compatible with virtually any boiler, e.g. gas, oil, solid fuel, Aga / Rayburn stoves, wood burning stoves, back boiler units, solar heating, electric boilers and may be heated with an electric immersion heater.

Due to the high operating temperature of thermal storage systems condensing boilers may not be cost effective with the standard models but are ideal partners for the SSP models.

### **BOILER SIZING**

Calculate the space heating requirements in accordance with BS 5449. Add an allowance of 3 kW for hot water.

### **BOILER PUMP OVER RUN**

In a conventional system a pump overrun is often fitted to the boiler to dissipate excess heat from the boiler and so aid system efficiency.

When using a Thermal Storage system, such as FlowTherm, it is essential that this overrun is timer controlled to ensure maximum efficiency.

When FlowTherm units are to be used with a boiler that requires any form of pump overrun then the existing pump overrun device must be disconnected and our timed pump overrun device used in its place. The boiler pump overrun will be solely under the control of our timed pump overrun device and this will ensure maximum efficiency.

## **PRIMARY SYSTEM OVER RUN**

The feed and expansion cistern should be positioned so that the unexpanded water level is at least 500mm above the highest point of the primary system. The boiler manufacturer's instructions should be consulted. This applies with both cylinder and combination type FlowTherm units.

The flow pipe from the boiler should rise continuously towards the FlowTherm (Figure 6).

Where the primary flow and return pipes between the boiler and the FlowTherm are dipped e.g. Wall mounted boiler with the FlowTherm sited at floor level, automatic air vents should be fitted on both the flow and the return together with a high limit thermostat on the boiler itself (Figure 7).

Provision should be made for easy draining of the system. Electric units and SSP models have provision for the fitting of a standard draining tap on the body of the unit.

On the boiler models provision for the draining should be provided somewhere in the radiator circuit.

In certain applications it may be necessary to fit a frost guard onto the FlowTherm. This consists of an extension of the overflow pipe inside the feed and expansion cistern. This extension dips below the water level and prevents cold air entering the cistern. This device prevents excessive condensation entering the overflow warning pipe.

For optimum efficiency FlowTherm should be used in conjunction with a room thermostat and thermostatic radiator valves. When fitting thermostatic radiator valves it is standard practice to fit them to every radiator except one. This radiator acts as a bypass in the event that all of the thermostatic radiator valves shutting off. It is important to select the bypass radiator with care, the bathroom is usual.

## **INSTALLATION PROCEDURE**

### **OPEN VENTED PRIMARY SYSTEM**

When installing standard FlowTherm models the unit must be installed as part of an open vented primary system. This ensures that the system is inherently safe, with pressure and temperature relief valves not being required. The maximum total volume of the primary circuit is the volume of the FlowTherm + 180 litres.

### **SEALED SYSTEM PRIMARY MODELS**

The extra primary coil fitted in SSP FlowTherm models allows the unit to be installed with a sealed primary system operating at upto 3.5 bar.

### **LOCATION**

Ensure that the location selected will accommodate the chosen unit (see dimension chart) whilst still allowing access for all the plumbing connections and components and not forgetting the routing of the discharge warning pipe (overflow).

The unit should be sited on a flat base capable of supporting the weight when full. This will range from 180-260 Kg. With combination units, to ensure compliance with the water bylaws, a minimum clearance of 225mm, between the top of the unit and the ceiling, is needed should the Float valve ever need maintenance.

Where immersion heaters are fitted care should be taken to ensure that they can be withdrawn for servicing.

Care should be taken to ensure that the wiring centre and / or programmer are not sited such that they could be damaged by any escape of water.

FlowTherm systems operate at higher temperatures than conventional cylinders and so adequate ventilation is important in order to avoid excessive airing cupboard temperatures. Vents at both high and low level are a good solution. Care should be taken to site the vents where they will not be obstructed. Directing the vents into the bathroom can provide useful background heating.

## **PIPE CONNECTIONS**

This section should be used on conjunction with the diagram of your chosen system design. The following pipe connections are necessary.

22mm flow and return primaries from the boiler, unless the boiler manufacturer requires 28mm. (Not electric models)

22mm flow and return pipes to the space heating. (Not electric models).

We recommend that all the primary pipe work in the airing cupboard should be insulated to reduce the standing heat losses and prevent high cupboard temperatures.

Mains water supply should usually be 22mm o/d pipe. See section on water supply. With cylinder type units the water level in the primary feed and expansion cistern should not be more than 10 metres above the bottom of the FlowTherm. These units require a 22mm open vent pipe from the top connection. This vent must rise continuously, unimpeded to the primary feed and expansion cistern. No valves are permitted in this pipe so that an open vent is always maintained in case a heat source runs out of control. A feed pipe (22mm minimum) must be provided from the feed and expansion cistern to the cold feed connection at the cylinder base. No valves are permitted in this pipe.

Combined feed and vent arrangements must not be used.

An overflow (warning pipe) must be provided for the feed and expansion cistern. This pipe should fall continuously to a safe but conspicuous discharge point. As this is a primary discharge warning pipe, the pipe work must be capable of handling water at up to 90°C.

Experience has shown that plastic overflow fittings and pipe work are prone to melting in fault conditions and become brittle over time. We recommend using copper pipe of at least 22mm diameter on standard boiler and SSP models.

Copper ball valves, floats and overflow pipe work must be used on Electric models and on any unit connected to a solid fuel boiler or similar heat source without thermostatic control.

Consideration should be given to the provision of servicing valves both to facilitate maintenance and to assist in balancing the system.

## **ELECTRICALLY HEATED UNITS**

Where electricity is used as the primary heat source it is important that immersion heaters manufactured to a suitable specification are used. Their low noise design will prevent the householders sleep being disturbed. The immersion heaters should be set to 80°C.

A copper ball valve and float should be used with all thermal store F&E tank units.

## **CONNECTING ADDITIONAL HEAT SOURCES TO FLOWTHERM UNITS**

Back boilers and solid fuel boilers can be connected easily to FlowTherm units.

Standard boiler models have two extra bosses as standard. On Electric and SSP models these bosses are an optional extra.

Overheat protection for the system should be provided as follows .

Where space heating is provided from the store a high limit thermostat should be fitted on the flow pipe from the solid fuel boiler. The high limit thermostat should actuate on temperature rise and be set at approximately 85°C.

The stat should be wired so as to trigger the space heating pump. This triggering of the space heating pump should happen regardless of the setting of the programmer and one of the radiators must be without a thermostat radiator valve to allow for expansion.

With Electric and SSP models, where space heating is not provided from the store, alternative methods of dispersing the excess heat is needed. A heat leak radiator in the gravity circuit of the solid fuel boiler is the usual method.

Immersion heaters have integral high limit cutouts, and care should be taken to avoid nuisance tripping from the additional heat source.

## **BOILER MODELS**

The wiring of a double pump package is split into two separate circuits.

Circuit 1 – When the room thermostat calls for heat its contacts close supplying power to the space heating pump (subject to the programmer CH settings).

Circuit 2 – When the FlowTherm store cools the store thermostat calls for heat, its contacts close supplying power to the boiler pump and the boiler switched live (subject to the programmer HW setting).

When the store thermostat is satisfied the contacts open and power is disconnected from the boiler switched live. In a double pump package, power is maintained to the boiler pump by the pump overrun timer for a further 4-6 minutes.

The programmer should be set to gravity operation. There is usually a switch, or jumper tag, on the rear of the programmer facia. This will prevent the user from operating the heating without the hot water being on.

If you wish to add a frost thermostat to protect the boiler wire it between the boiler permanent live and the boiler switched live. The frost stat should be situated in the same environment as the boiler. See the manufacturers instructions when fitting.

## COMMISSIONING

Prior to turning on water to the secondary system check that the pressure in the expansion vessel is approximately 3.5 bar (50 PSI).

Filling the system should be carried out slowly via the float operated valve, constant checks being made for leaks whilst the system is being filled, any factory made pipework, joints require careful checking at this point as the rigours of transport may have affected their water tightness.

It is essential to flush the complete system thoroughly, to remove any contamination from the pipe work and the ThermFlow. Corrosion inhibitor is required in all FlowTherm models. Sentinel X100, or Fernox MBI should be added gradually into the stream of water from the ball valve as the unit fills to ensure its even distribution throughout the system.

When calculating the amount of inhibitor to use take account of the FlowTherm volume that is part of the primary system. On SSP models you should dose both sections of the primary circuit i.e. that contained in the store and that in the radiator / boiler circuit.

Add inhibitor and where necessary anti-scalant to the system in accordance with the manufacturer's instructions.

Following standard installation procedures, air should be bled from the radiators and high points in the pipe work

### COMMISSIONING BOILER MODELS

If the boiler has a range of outputs it should be set to the maximum output.

The boiler thermostat must be set to maximum. This will ensure FlowTherm operates at maximum efficiency.

In order to ensure optimum performance without boiler cycling the FlowTherm store thermostat must be set 3-4°C below the setting of the boiler thermostat.

The following procedure is the best way of achieving this critical setting.

### FLOWTHERM STORE SETTING PROCEDURE

1. Check the boiler thermostat to set to maximum and the boiler pump to high.
2. Turn the insertion thermostat to 85-90°C temporarily.
3. Fire up the system with the programmer set to hot water only.
4. Wait until the boiler has stopped firing.
5. Turn the store thermostat down slowly until it clicks off, shutting the boiler pump off. (If our timed pump overrun is fitted then wait 4-6 minutes for the pump to stop).
6. Once the thermostat has clicked off turn down a further 1mm (boiler models). With SSP models then turn the stat down a further 5°C.
7. The hot water system is now commissioned. If commissioned correctly the store thermostat controls the system. There should be no on/off cycling in a hot water only mode or boiler pump running continuously.

Test the insertion thermostat is correctly set by cooling the store to energise the thermostat. (see fig 15). Temporarily run hot taps or switch the heating on until the boiler re-ignites, switch off hot taps or heating and allow store to reheat on hot water only to check that the insertion thermostat is in control of the system.

Check that the hot water from the taps is at the temperature required by the householder and adjust the blender if necessary. (Note the blender is factory preset to approx. 55°C.) Adjust the blender gradually waiting about 20 seconds each time for the adjustment to be reflected at the taps.

Ensure the protective cap is secure in position after making any adjustment.

The fact that all hot and cold water is supplied directly from the mains means that more care is needed in balancing the system than in conventional cistern fed systems. The use of servicing valves often serves as a convenient means of achieving this balance.

The boiler pump should be adjusted to give maximum flow without producing excessive noise.

To ensure efficient operation of the FlowTherm unit it is essential that the insertion type thermostat supplied with our unit is used. Strap on thermostats are not suitable.

## **FAULT FINDING**

It is important to bear in mind that the FlowTherm system effectively works in reverse to conventional systems, i.e. The primary water is in the storage vessel. Unlike a conventional system, hot water draw-off temperature will be flow dependent and this factor must be taken into account when assessing system performance.

Symptoms and likely causes to investigate.

### **LOCATING THE CAUSES OF A NOISEY SYSTEM**

Boiler Noise.

Boiler noise is usually caused by not taking the heat away from the boiler heat exchanger. Check the temperature differential between the primary flow and return. It should be between 7 and 11 °C. Adjusting the pump speed may help.

### **STORE HOT BUT HOT WATER PERFORMANCE HAS DETERIORATED**

If hot water performance deteriorates suddenly this usually points to a problem with the blender. If it has deteriorated gradually then this points to scale build up.

The following procedure allows you to check for scale build up and blender function.

Remove the blender valve from the circuit. This will show you exactly what the unit can produce.

If the performance improves then this indicates a problem with the blender. This is often caused by a loss of pressure from the expansion vessel. See annual maintenance notes. If there is no improvement then it is likely that there is scale in the inside of the coil.

The scale can be removed with the FlowTherm in situ by a qualified technician using a high pressure de-scaling pump and suitable acidic de-scaling chemical (e.g. Fernox DS3). The store must be cooled to between 30 and 40°C before commencing the de-scaling. This is not a job to DIY because of the specialist equipment needed. If you have difficulty locating a technician please contact Lime Guard UK (Tel: 01284 700 855) who are experts in this field.

Check the blender for scale at the same time.

### **WATER COMING FROM THE FEED PIPE AND EXPANSION CISTERN WARNING PIPE**

An occasional small discharge is normal and is generally due to condensation. In severe cases a frost guard may be necessary.

Continual overflow should be investigated as follows. Isolate the ball valve. If this cures the problem first inspect the float for leaks. Secondly inspect the ball valve seat. If the ball valve is OK isolate the cold water supply. If it stops then there may be a leak in the coil. This will be continuous. The entire FlowTherm unit will require replacement.

## ANNUAL MAINTENANCE

### 1. Checking the pressure in the expansion vessel.

The pressure can only be accurately checked with the pressure relieved on the other side of the diaphragm. To do this isolate the water supply to the FlowTherm and open a hot tap. Water will run for a few seconds then stop.

The pressure should be 3.5 bar.

### 2. Checking the ball valve (combination types only).

FlowTherm combination types have an integral feed cistern for the primary (boiler & radiator) circuit. A 15mm pipe runs from just below the blender via a brass isolating valve to the ball valve in the top tank.

Remove the lid and check the condition and operation of the ball valve and float. If you have a copper float, check for cracks and signs of damage due to excessive temperature. This is almost always caused by failure of the store or boiler thermostat. Copper floats are factory fitted to all FlowTherm units.

Check the water level in this tank is between 50 to 150mm deep. It is normal for the water to be warm and it will often be discoloured by the anti corrosion additives put into the primary system during commissioning.

Check that when the ball valve is held open simulating a fault condition that the water flow into the top tank does not exceed the ability of the overflow pipe to take it away. Adjust the brass 'Ballofix' isolating valve to suit.

Only the smallest flow rate is needed, as this ball valve only has to supply sufficient water to make up any lost through evaporation.

### 3. Checking the concentration of corrosion inhibitor.

The maintenance of sufficient concentration of corrosion inhibitor in your FlowTherm system is vital to prevent corrosion. We would recommend Sentinel X100 or (Ferox equivalent). When your unit also supplies the radiator system add extra 70 litres to the volume your FlowTherm and dose appropriately.

Although Electric models are not subjected to corrosion problems from the radiator system corrosion prevention is still necessary. As water is lost due to evaporation chemicals in the water become more concentrated and can become corrosive.

We recommend that the unit is drained down every year and refilled with fresh water.

### 4. Preventing pump seizure in summer.

To prevent seizure of the central heating pump we recommend you turn the central heating on for 30 seconds or so every few weeks throughout the summer.

### 5. Holidays

You can safely turn the unit off and isolate the water if you go on holiday.

If you want to leave the central heating on at a low level simply turn the room thermostat down. Do not isolate the water supply to the unit in this case.

# FLOWTHERM

RM Cylinders

Unit 4, Gilcar Way, Wakefield Europort, Castleford WF10 5QS  
Tel: 01924 228999 Fax: 01924 228990 Web: [www.rmcyllinders.com](http://www.rmcyllinders.com)