2021

FLEXIHEAT UK LTD
www.flexiheatuk.com
01202 822221

EXCELSIOR
WATER HEATING

Installation Manual

Designed and manufactured in the UK

Contents

Section 1
Introduction

The Excelsior unvented water heater is a high quality stainless steel unvented cylinder which can provide hot water from a cold mains water supply of between 1.5 bar and 16 bar.

The indirect heat exchanger surfaces are designed to provide a rapid heat up time. The unit comes complete with all the necessary safety equipment to comply with legislation governing the installation of such systems.

The Excelsior Solar and Heat Pump unvented water heaters have been designed for use with all solar panels and ground or air source heat pump systems requiring a storage and heating vessel (please ensure compatibility prior to installation).

1.1 Specifier's Guide

The Law & Unvented

It is legal to fit an unvented unit into any property. There is no longer a requirement to have an old-fashioned 'Tank in the Roof' system.

The Benefits of Excelsior

- Duplex stainless steel
- High quality finish
- Low heat loss for maximum economy
- No sacrificial anode - low maintenance

The Benefits of Unvented Systems

- The Excelsior fills a bath in minutes and can run two at the same time
- The Excelsior can work off electricity (Economy 7) or alternative energy systems*
- A power shower without the noisy pump
- No tanks in the roof
- No ball cocks to jam or leak
- All your water, hot and cold, direct from the mains
- Site the Excelsior unvented water heater wherever convenient**

*Not suitable for solid fuel boilers.
**Refer to 'Siting the Excelsior unit' in section 3.1.

Excelsior Solar

The Excelsior solar range is available in many vessel capacities, in both direct (electric) or indirect models.

Each cylinder has been specifically designed for use with an alternative energy heating system and includes a large corrugated coil heat exchanger that provides optimum heat transfer from the alternative heat source to the water in the cylinder.

The Excelsior solar unvented water heater should only be used as part of a solar installation and configured as shown. Additional safety devices may be required if the cylinder is operated with other heat sources.

Excelsior Heat Pump

The Excelsior Heat Pump range has been specifically designed to optimise the output from the heat pump. It is fitted with a corrugated coil heat exchanger that has a larger diameter than that used on the standard Excelsior cylinders.

Always ensure the correct type of cylinder is paired with the renewable heat source. Failure to do this may result in the system being inefficient and in extreme cases cause failure of components. Consult the heat pump/solar installation manual prior to cylinder installation.

1.2 Standard Equipment

Check that all the components of your Excelsior unit are contained in the kit prior to installation. Your Excelsior should include:

- 3kW heating element - incorporating control thermostat and re-settable safety cut-out
- Combination (control) valve comprising: Line strainer, non-return (check) valve, pressure reducing valve & expansion relief valve
- Tundish - 15mm female x 22mm female
- Temperature/Pressure relief valve - set at 90°C and 7 bar pressure (factory fitted)
- Cylinder thermostat - temperature control setting 30-70°C (indirect units only)
- Thermal cut-out - set to operate at 82°C +/-5°C (indirect units only)
- Expansion vessel - with capacity to suit vessel size (external expansion units only)
- Motorised valve (indirect units only)

Section 2

Dimensions & Performance

The diagrams on the following pages show the standard range of Excelsior vessels. All dimensions are in millimeters unless otherwise stated. (Tolerance +/- 10mm).

All unvented installations must comply with local building regulations:
England & Wales: G3 Building Regulations; Scotland: Technical Standard P3; Northern Ireland: Building Regulation P5

Excelsior coil data is based on a max primary flow temperature of 80°C; water flow and return temperature differential of 20°C; it is recommended that the back pressure in the coil is restricted to 0.3 bar.
All vessels in the Excelsior range have a maximum working pressure of 5.5 bar.
See table below for flow rates.

2.1 Coil Information

Coil size / Maximum coil output (kW)	Approximate coil surface area (sq. m)	Approximate coil volume (Ltrs)	Recommended flow rates through coil (Ltrs/Min)
DN20 / 14	0.54	2.0	24.0
DN20 / 20	0.75	3.0	19.0
DN20 / 30	1.10	4.0	16.5
DN25 / 54	2.00	9.5	28.0
DN25 / 81	3.00	14.5	23.5

2.2 Heating Performance

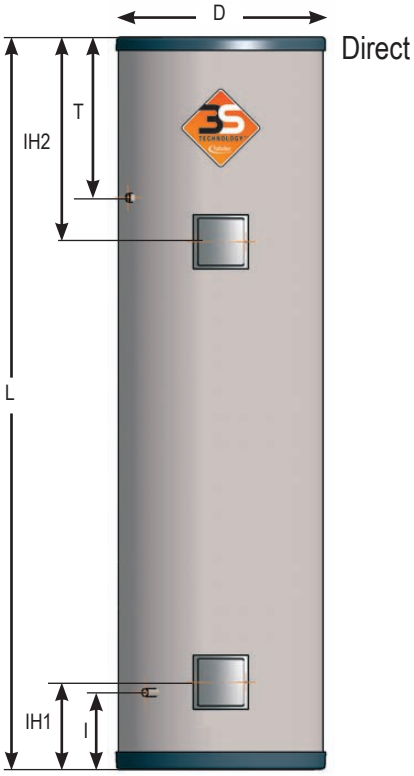
		Direct		Indirect		Coils (kW)	Weight (kg)		Weight (kg) Full	
Vessel	Standing Heat Loss (kW/24h)	Reheat time after 70% draw off*	Time to heat from cold to 65ºC*	Reheat time after 70% draw off*	Time to heat from cold to 65ºC*	Primary	Direct	Indirect	Direct	Indirect
80L	0.77	71	102	15	21	14.6	25	30	105	110
100L	0.85	80	110	17	24	14.6	27	32	127	132
130L	0.97	83	115	20	27	14.6	30	35	160	165
150L	1.06	109	123	22	31	14.6	35	40	185	190
175L	1.21	131	148	21	31	20	40	45	215	220
215L	1.39	157	182	26	37	20	45	50	260	265
255L	1.52	191	229	29	42	20	50	55	305	310
280L	1.64	210	245	32	44	20	53	58	333	338
305L	1.77	228	261	34	46	20	55	60	360	365
400L	2.35	220	340	40	57	27	65	68	465	468
500L	2.74	326	425	55	71	27	75	78	575	578

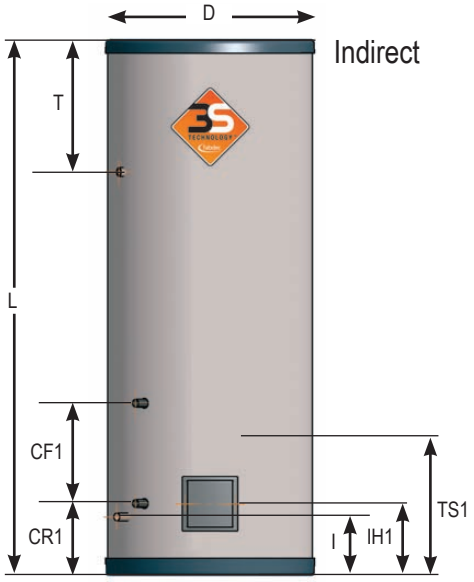
* Time (minutes)

		Solar Direct		Solar Indirect		Coils (kW)		Weight (kg)		Weight (kg) Full	
** Vessel	Standing Heat Loss (kW/24h)	Reheat time after 70% draw off*	Time to heat from cold to 65ºC*	Reheat time after 70% draw off*	Time to heat from cold to 65ºC*	Aux / Boiler Coil	Primary	Solar Direct	Solar Indirect	Solar Direct	Solar Indirect
130L	-	16	20	-	-	14.6	20	35	40	165	170
150L	-	19	23	-	-	14.6	20	40	45	190	195
175L	-	14	20	14	20	20	27	45	50	220	225
215L	-	17	24	17	24	20	27	50	55	265	270
255L	-	20	29	20	29	20	27	55	60	310	315
305L	-	24	34	24	34	20	27	60	65	365	370

* Time (minutes)

2.3 WXI Range with 3S TECHNOLOGY technology and internal expansion





Direct with 3S internal expansion (self-sustaining air-gap system)

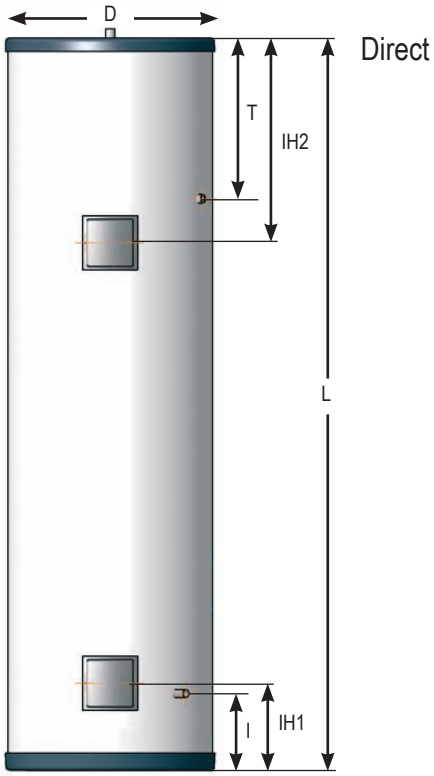
Size	L	D	I	T	IH1	IH2
80L	703	576	182	222	196	-
100L	860	576	182	318	196	457
130L	1043	576	182	331	196	540
150L	1235	576	182	395	196	613
175L	1370	576	182	507	196	673
215L	1666	576	182	550	196	754
255L	1884	576	182	550	196	780
280L	2028	576	182	588	196	875
300L	2150	576	182	560	196	847
400L	1522	756	220	460	235	657
500L	1896	756	220	495	235	891

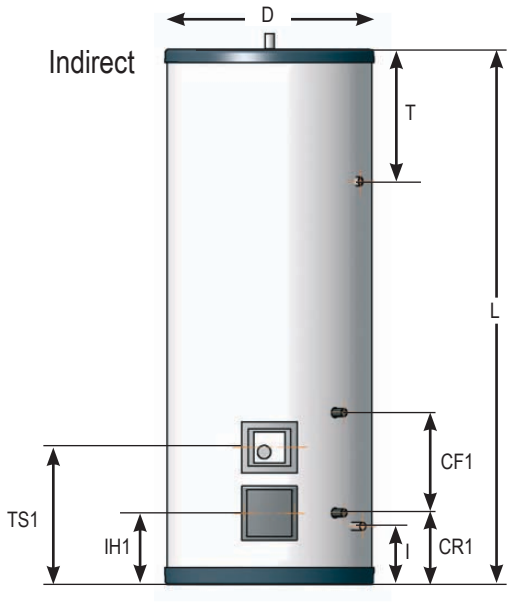
Indirect with internal expansion (self-sustaining air-gap system)

Size	L	D	I	T	IH1	CR1	CF1	TS1	Coil Rating
80L	703	576	182	222	196	213	88	246	14.6kW
100L	860	576	182	318	196	213	88	246	14.6kW
130L	1043	576	182	331	196	213	193	358	14.6kW
150L	1235	576	182	395	196	213	193	358	14.6kW
175L	1370	576	182	507	196	213	263	380	20.0kW
215L	1666	576	182	550	196	213	263	380	20.0kW
255L*	1884	576	182	550	196	213	263	380	20.0kW
280L*	2028	576	182	588	196	213	263	380	20.0kW
300L*	2150	576	182	560	196	213	263	380	20.0kW
400L*	1522	756	220	460	235	250	250	373	27.0kW
500L*	1896	756	220	495	235	250	250	373	27.0kW

* These vessels are also available with 28mm diameter stainless steel inlet & outlet for high water flow

2.4 WDE Range with external expansion





Direct with 3 bar external expansion

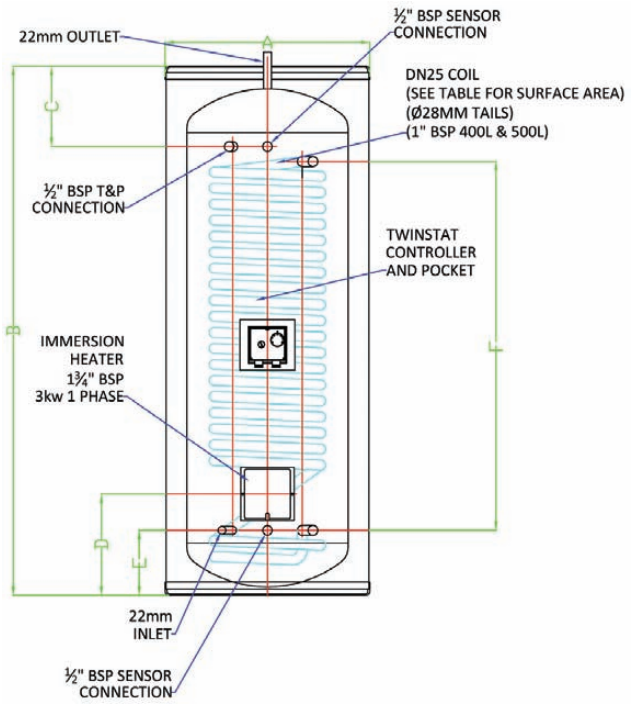
Size	L	D	I	T	IH1	IH2
80L	665	576	182	222	196	N/A
130L	957	576	182	222	196	454
150L	1085	576	182	222	196	463
175L	1242	576	182	222	196	545
215L	1484	576	182	222	196	572
255L	1752	576	182	222	196	648
305L	2028	576	182	222	196	725
400L	1405	756	220	262	235	515
500L	1690	756	220	262	235	660

Indirect with 3 bar external expansion

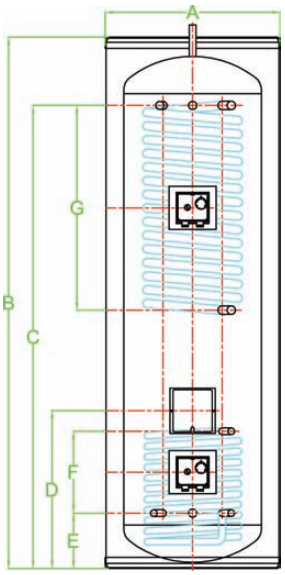
Size	L	D	I	T	IH1	CR1	CF1	TS1	Coil Rating
80L	665	576	182	222	196	213	88	246	14.6kW
130L	957	576	182	222	196	213	193	358	14.6kW
150L	1085	576	182	222	196	213	193	358	14.6kW
175L	1242	576	182	222	196	213	263	380	20.0kW
215L	1484	576	182	222	196	213	263	380	20.0kW
255L	1752	576	182	222	196	213	263	380	20.0kW
305L	2028	576	182	222	196	213	263	380	20.0kW
400L	1405	756	220	262	235	250	245	373	27.0kW
500L	1690	756	220	262	235	250	245	373	27.0kW

2.5 Heat Pump WHP Range with external expansion

Heat Pump Single Coil



Heat Pump Twin Coil



Heat Pump single coil with external expansion

Size	A	B	C	D	E	F	HP Coil Surface Area*
150L	575	1085	225	284	182	678	2m²
175L	575	1242	225	284	182	720	2m²
215L	575	1485	225	284	182	1035	3m²
255L	575	1752	225	284	182	1035	3m²
305L	575	2028	225	284	182	1035	3m²
400L	750	1405	262	303	228	495	4m²
500L	750	1690	262	303	228	495	4m²

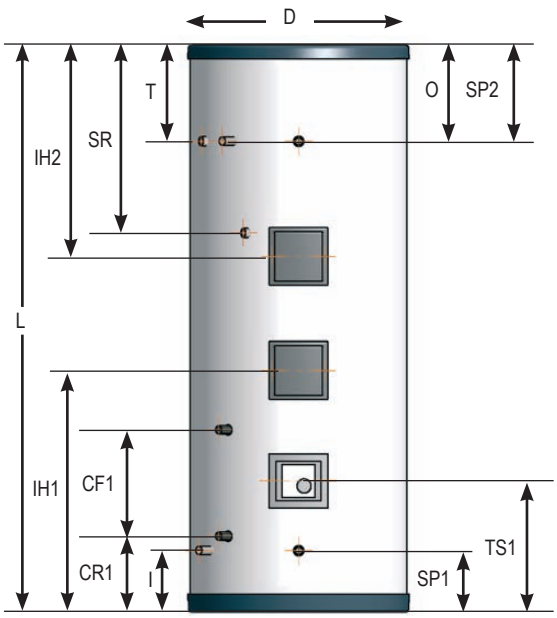
Heat Pump twin coil with external expansion

Size	A	B	C	D	E	F	G	HP Coil Surface Area*	Solar Coil Surface Area
215L	575	1485	1259	520	182	270	675	2m²	1.1m²
255L	575	1752	1527	520	182	270	675	2m²	1.1m²
305L	575	2028	1800	520	182	270	675	2m²	1.1m²
400L	750	1430	1196	655	276	315	480	3m²	1.1m²
500L	750	1715	1481	655	276	315	720	4m²	1.1m²

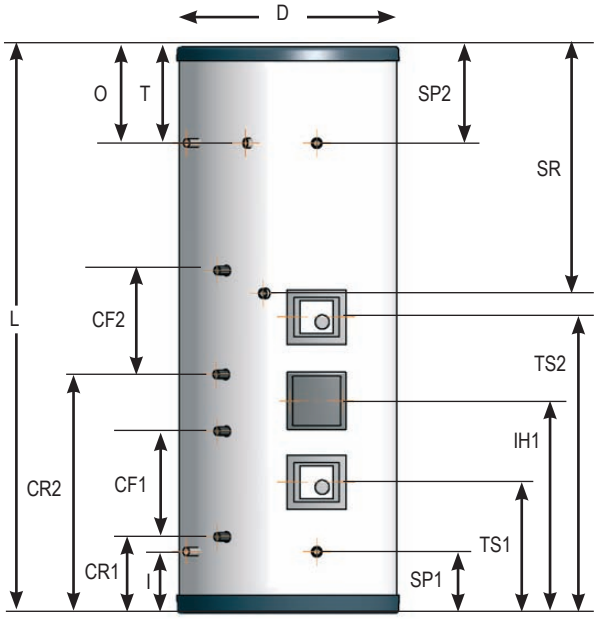
Standard coil inlet and outlet diameter 28mm (DN25)
Other vessel sizes available upon request.
*Other coil sizes available upon request.

2.6 Solar WS Range with external expansion

Solar Direct



Solar Indirect



Solar Direct with external expansion

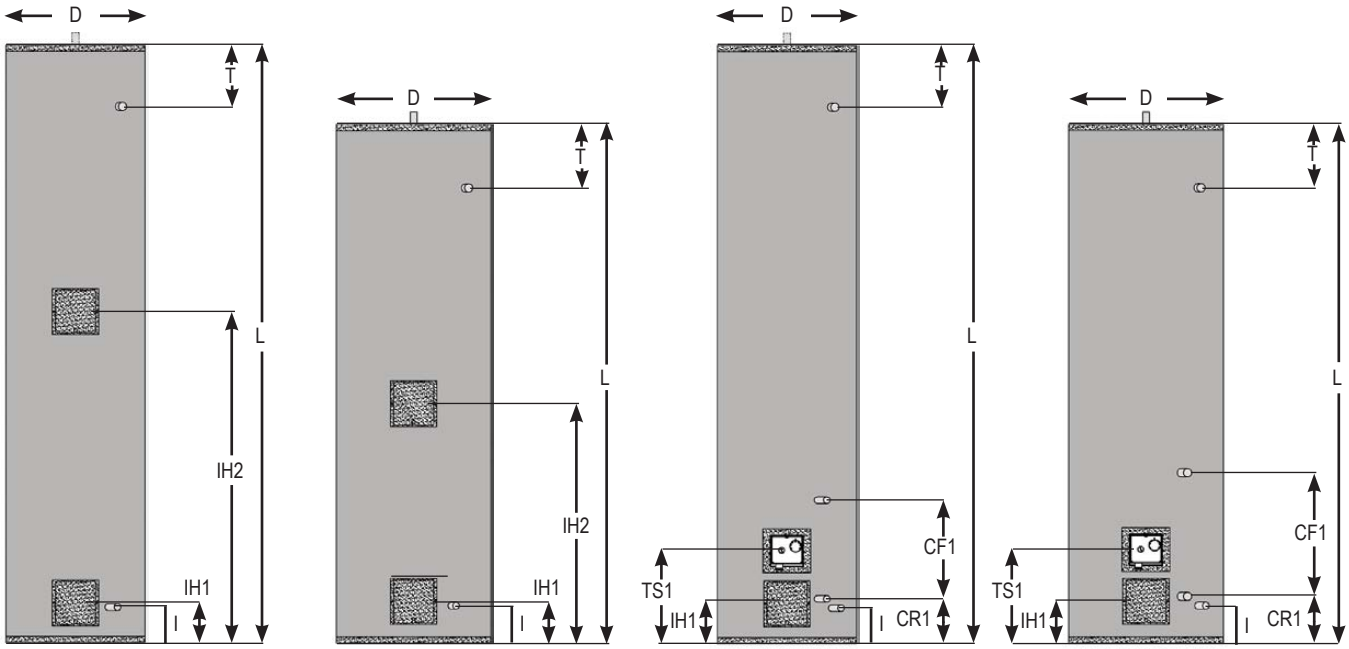
Size	L	D	I	T	CR1	CF1	SP1	TS1	IH1	SR	IH2	SP2	O	Solar Coil Surface Area*	Solar Volume
130L	958	578	183	226	213	193	183	297	454	325	349	226	226	0.75m²	56L
150L	1086	578	183	226	213	193	183	297	509	340	402	226	226	0.75m²	56L
175L	1243	578	183	226	213	267	183	344	584	473	402	226	226	1.1m²	69L
215L	1485	578	183	226	213	267	183	337	587	665	476	226	226	1.1m²	69L
255L	1753	578	183	226	213	267	183	337	587	665	476	226	226	1.1m²	69L
305L	2029	578	183	226	213	267	183	337	587	665	476	226	226	1.1m²	69L

Solar Indirect with external expansion

Size	L	D	I	T	CR1	CF1	SP1	CR2	CF2	TS1	IH1	SR	SP2	TS2	O	Solar Coil Surface Area*	Aux Coil Surface Area*	Aux Coil Rating	Solar Volume
130L	958	578	183	226	213	193	183	504	193	297	454	325	226	612	226	0.75m²	0.54m²	14.6kW	56L
150L	1086	578	183	226	213	193	183	504	193	297	454	340	226	612	226	0.75m²	0.54m²	14.6kW	56L
175L	1243	578	183	226	213	267	183	578	263	345	530	473	226	715	226	1.1m²	0.75m²	20.0kW	69L
215L	1485	578	183	226	213	267	183	582	263	337	530	591	226	715	226	1.1m²	0.75m²	20.0kW	69L
255L	1753	578	183	226	213	267	183	582	263	337	530	665	226	715	226	1.1m²	0.75m²	20.0kW	69L
305L	2029	578	183	226	213	267	183	582	263	337	530	665	226	715	226	1.1m²	0.75m²	20.0kW	69L

Innovative hot water outlet to reduce thermal losses.
*Other coil sizes available upon request.

2.7 Slimline / Super-Slimline WT Range with external expansion



Slimline Direct with external expansion

Size	L	D	I	T	IH1	IH2
100L	1044	515	179	207	193	550
130L	1326	515	179	207	193	643
150L	1466	515	179	207	193	682
175L	1738	515	179	207	193	832
210L	2010	515	179	207	193	1008

Slimline Indirect with external expansion

Size	L	D	I	T	IH1	CR1	CF1	TS1	Coil Rating
100L	1044	515	179	207	193	209	320	360	14.6kW
130L	1326	515	179	207	193	209	320	360	14.6kW
150L	1466	515	179	207	193	209	320	360	14.6kW
175L	1738	515	179	207	193	209	400	360	20.0kW
210L	2010	515	179	207	193	209	400	360	20.0kW

Super-Slimline Direct with external expansion

Size	L	D	I	T	IH1	IH2
80L	1110	462	165	200	179	-
100L	1344	462	165	200	179	664
130L	1716	462	165	200	179	850
150L	1935	462	165	200	179	1122
165L	1998	462	165	200	179	1221

Super-Slimline Indirect with external expansion

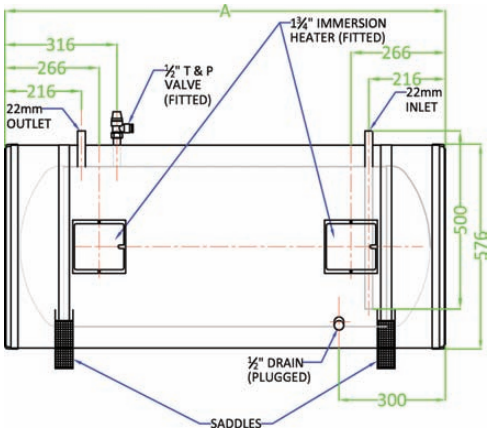
Size	L	D	I	T	IH1	CR1	CF1	TS1	Coil Rating
80L	1110	462	165	200	179	195	320	351	14.6kW
100L	1344	462	165	200	179	195	320	351	14.6kW
130L	1716	462	165	200	179	195	320	351	14.6kW
150L	1935	462	165	200	179	195	320	351	14.6kW
165L	1998	462	165	200	179	195	400	395	20.0kW

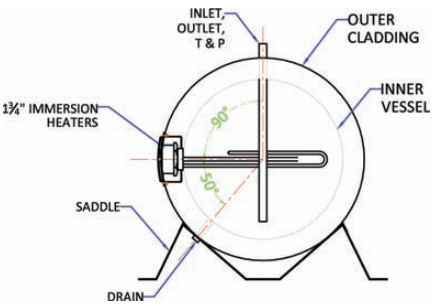
SLIMLINE and SUPER-SLIMLINE vessels are also available with Coil/s in RENEWABLES configuration. Please enquire.

2.8 Horizontal - WZ Range with external expansion

Horizontal Direct

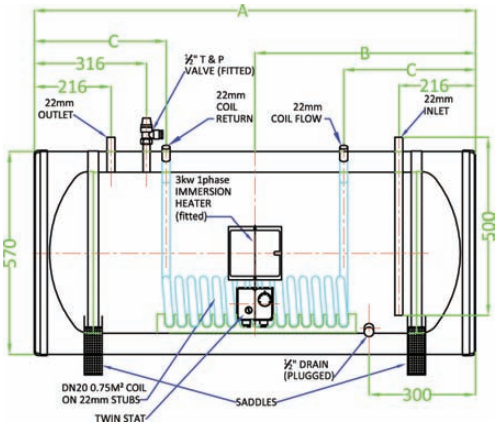
Size	A
130L	957
150L	1085
175L	1242
215L	1484
255L	1752
305L	2028

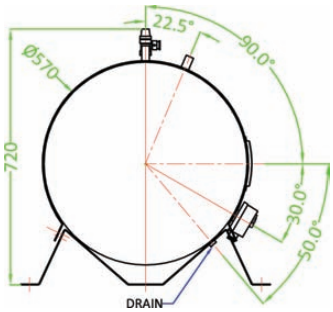




Horizontal Indirect

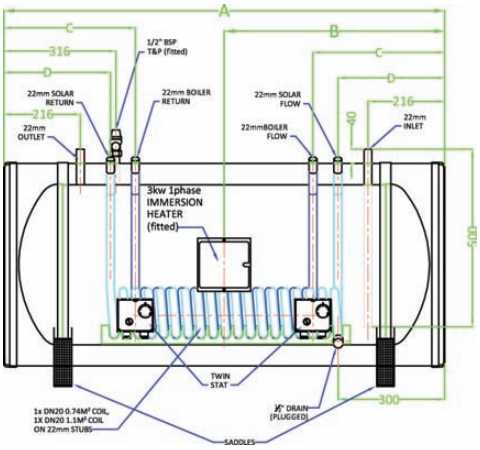
Size	A	B	C	Aux Coil m^2
130L	957	478	298	0.54
150L	1085	543	363	0.54
175L	1242	621	371	0.75
215L	1484	742	492	0.75
255L	1752	876	626	0.75
305L	2028	1014	769	0.75





Horizontal Twin Coil

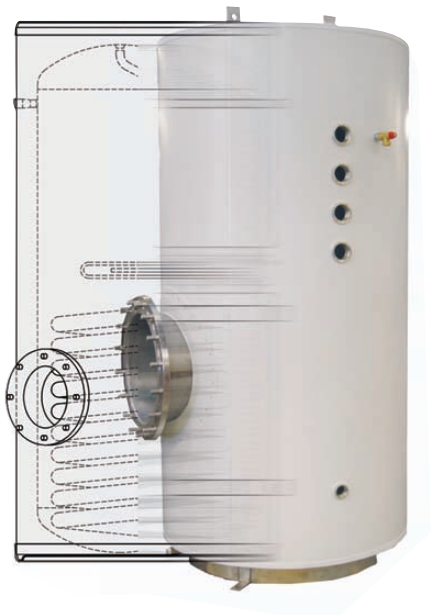
Size	A	B	C	D	Solar Coil m^2	Aux Coil m^2
150L	1085	543	363	293	0.75	0.54
175L	1242	621	371	301	1.1	0.75
215L	1484	742	492	422	1.1	0.75
255L	1752	876	626	556	1.1	0.75
305L	2028	1014	769	594	1.1	0.75



2.9 Commercial WI and Buffer WB Vessels

The high performance and design values of the Excelsior vessel can also be obtained in a commercial/bespoke format (ODP=0, GWP=1).

These vessels can be built to the requirements of the specifier; with connection bosses, coils, inlets, outlets, pockets and ancillary equipment all located and sized to your specification.



Connection Bosses
- Size & location

Coils
- Length
  Materials
  Surface area
  Positioning

Inlets / Outlets
- Size & location

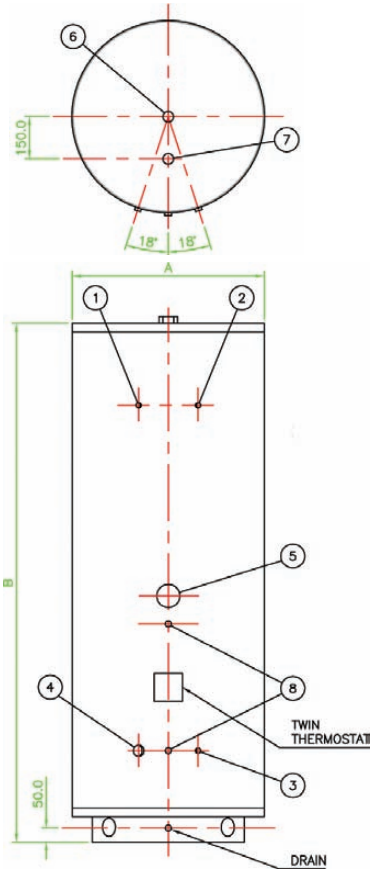
Pockets (eg: temperature sensor)
- Size & location

Ancillary equipment
- Expansion kits, gauges, pumps etc...

Water heating vessels are available up to 10,000 litres & buffer/storage vessels up to 32,000 litres.
Design service available on request.

Commercial Vessels

Size	A	B	4	6	8	Coil Rating
450L	750	1565	1"	1"	Ø28	27kW
500L	750	1720	1"	1"	Ø28	27kW
680L	750	2250	1"	1"	Ø28	54kW
840L	750	2745	1½"	1½"	Ø28	54kW
965L	1080	1850	1½"	1½"	Ø28	54kW
1125L	1080	2100	1½"	1½"	Ø28	54kW
1380L	1180	2120	1½"	1½"	Ø28	54kW
1775L	1180	2620	1½"	1½"	Ø28	54kW
1875L	1380	2050	2"	2"	Ø28	54kW
2155L	1380	2332	2"	2"	Ø28	54kW



	Description
1	Auxiliary (½" BSP) connection
2	Auxiliary (½" BSP) connection
3	Auxiliary (½" BSP) connection
4	Inlet (1",1½", 2" BSP) connection
5	Immersion Heater (2 ¼" BSP) connection
6	Outlet (1",1½", 2" BSP) connection
7	Temperature & Pressure Relief Valve (¾" BSP) connection
8	Coil Connections (Upper and Lower)

Section 3
Installation

3.1 Installation Requirements

Warning: under no circumstances must the factory-fitted temperature pressure relief valve be removed. This will invalidate any guarantee or claim. The cold-water inlet valve assembly must be fitted or the Excelsior unit will not perform satisfactorily.

Do not attempt to vent the primary circuit through the excelsior unit. All external heat sources should be installed according to the manufacturer's instructions and the primary circuit through the excelsior unit must be pumped.

Siting the Excelsior unit

Note: Excelsior cylinders are designed for indoor use only.

The unit can be placed anywhere convenient. Since it is connected directly to the mains water supply it is equally efficient on any floor. Avoid areas that may be subject to frost. Try to keep pipe runs as short as possible for maximum economy, especially hot water discharge pipes running down from the Excelsior unit.

The unit can be fitted into a conventional airing cupboard and does not require any additional insulation. The vessel should be sited 250mm from walls to enable access to pipework and controls during installation and servicing. Ensure the floor is flat and able to withstand the fully laden weight of the vessel as stated in section 2.2 above.

The water supply to the cylinder should be potable water direct from a public mains supply with any water treatment equipment functioning correctly.

Vertical cylinders

If installing a vertical cylinder, ensure it is fixed securely in an upright position for correct operation.

Horizontal cylinders

If installing a horizontal cylinder, ensure it is fixed securely with the temperature and pressure relief valve positioned at the top for correct operation.

Storage & Handling

If the cylinder is not being installed immediately, it should remain in its protective wrapping with all pipe end protective caps in place to prevent damage.

Connecting the Water Supply

Pipework is not supplied. All pipework should be installed using good plumbing practice. We recommend 22mm mains cold water supply is used. Install a stop cock valve before the cold water inlet assembly on the incoming mains water supply so the unit can be isolated if required.

Combined Cold Water Valve (also known as Combination Valve)

The combined cold water valve (supplied) can be connected anywhere on the cold water mains prior to the unit. When installing the cold water valve, ensure that the arrow is pointing in the same direction as the mains water supply flow when connecting (see figures 5 and 6). Ensure that no valve is fitted in the pipework between the combined cold water valve and the vessel.

The cold water balancing port, on the valve, allows you to connect the cold water mains to the rest of the property thus giving balanced pressure throughout. If this facility is not required leave the cap on.

Check Water Pressure & Flow Rates

Flexiheat suggests 1.5 bar pressure & 20 Litres/minute flow rate to be the minimum requirements for satisfactory operation. The unit will still operate below this, but it will not be possible to run two or more outlets at the same time

A pressure reducing valve should always be fitted on the incoming mains.

Consideration should be given to the routing of the discharge pipe and the location of the solar panel or alternative energy source where applicable.

Drain Tap

A drain tap to drain the unit must be fitted to the cold-water inlet pipe between the Excelsior cylinder and the cold water valve assembly at its lowest level possible (see figures 2, 3 and 5).

Pipework to Taps

Ideally a 22mm pipe should supply the outlets throughout the property with short lengths (max 1 metre) runs of 15mm going to baths, showers, and basin taps. Smaller bore pipe can be used to suit taps.

3.1 Installation Requirements

Taps & Fittings

All taps and fittings incorporated into the unvented system should have a rated operating pressure of 7 bar or above.

Inlet Group

The inlet group will vary depending on whether the vessel is fitted as internal or external expansion (see figures 2, 3, 5 and 6).

Primary Circuit

The motorised valve supplied and the thermal cut-out (high limit stat) must be fitted to the primary flow.
(Use compression fittings only).

Operation of the cut-out & motorised valve

To comply with regulations and to prevent the temperature reaching 100°C the thermal cut-out supplied must be fitted. The thermal cut-out is wired in series to the cylinder thermostat. When the thermal cut-out senses an abnormal rise in temperature in the primary flow the electrical supply to the motorised valve will be cut and the valve will return to the closed position. This will cut-off the primary water from the boiler to the indirect coil in the cylinder.

If the thermal cut-out operates it must be reset manually. Check the cylinder stat and/or boiler stat.

Primary Circuit (Excelsior Solar)

Excelsior solar cylinders are suitable for connecting to a solar collector system and, where a twin coil is present (indirect) to a gas or oil central heating boiler.

Warning: solid fuel or wood burning boilers and gravity circulation systems must not be used on the primary circuit of an unvented hot water system.

The cylinder should be installed in accordance with the solar installation instructions for connection to the primary flow and return.

The Excelsior Solar range must only be connected to solar installations containing a hydraulic station with two non-return valves (one in the flow to the collector and one in the return). This will prevent thermal siphoning of the heat transfer fluid when the pump is switched off.

Where two non-return valves are not present or a hydraulic station is not used in the solar system, a second two-port valve must be installed into the flow of the solar coil and wired to the lower two-port valve.

The Excelsior Solar is supplied with one two-port motorised valve which should be connected in the flow to the auxiliary coil and wired to the upper twin thermostat of the cylinder.

Solar pump: The lower twin thermostat should be connected in line with the solar pump power supply.

The factory fitted temperature and pressure relief valve should not be removed from the cylinder or tampered with in any way. The valve is pre-calibrated to open at 7 bar or 90°C and any attempt to adjust it will invalidate the warranty and could affect the safety performance of the unit.

After installation, please leave a copy of the instruction manual with the vessel.

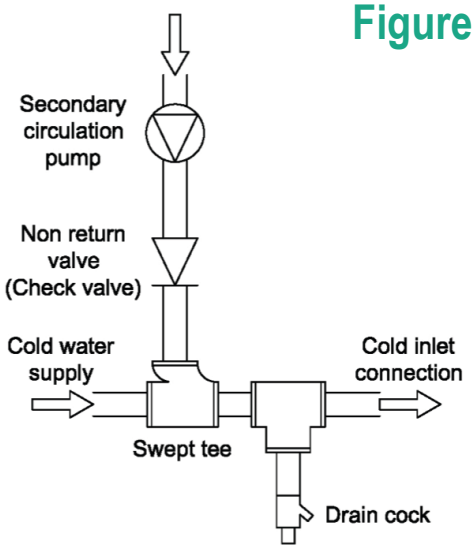
3.1 Installation Requirements

Secondary Return (where applicable)

All cylinders from 175 litres are fitted with a secondary return connection. Secondary circuit connections must be made to the cylinder in accordance with the recommended installation diagram. A drain cock (not supplied) should be fitted in the cold water inlet to facilitate draining of the cylinder (see Figure 1). A swept tee* is needed for all vessels below 175 litres if secondary circulation is required and is fitted as per the illustration. A non-return valve* must also be fitted to prevent backflow. A pump (not supplied) will be required to circulate the hot water. The return feed is in 15mm pipe and all work can be done on site.

Important: if a secondary circulation circuit is installed then a larger expansion vessel may be required to handle the increase in water volume. Calculate the additional water volume and contact Flexiheat regarding suitable vessel sizes.

Figure 1 - Secondary Return



External Expansion Vessel (where applicable)

This smaller tank is connected to the cold-water inlet side of the vessel. Mount the tank according to separate manufacturer's instructions provided with the external expansion vessel.

A suitable expansion vessel with a pre-charge pressure of 3.5 bar is supplied with Excelsior cylinders with external expansion.

The expansion vessel should be Tee'd off between the pressure relief valve and the cylinder (see figure 2) and should always be positioned with the entry point at the bottom. Installation should always be by means of a standard T connector ensuring no other valve is between this and the cylinder. Adjust the pressure to 3.0 - 3.5 bar.

3.2 Recommended Installation Schematics

Please ensure that no isolating valve is fitted between the expansion valve and vessel

Figure 2 - External Expansion

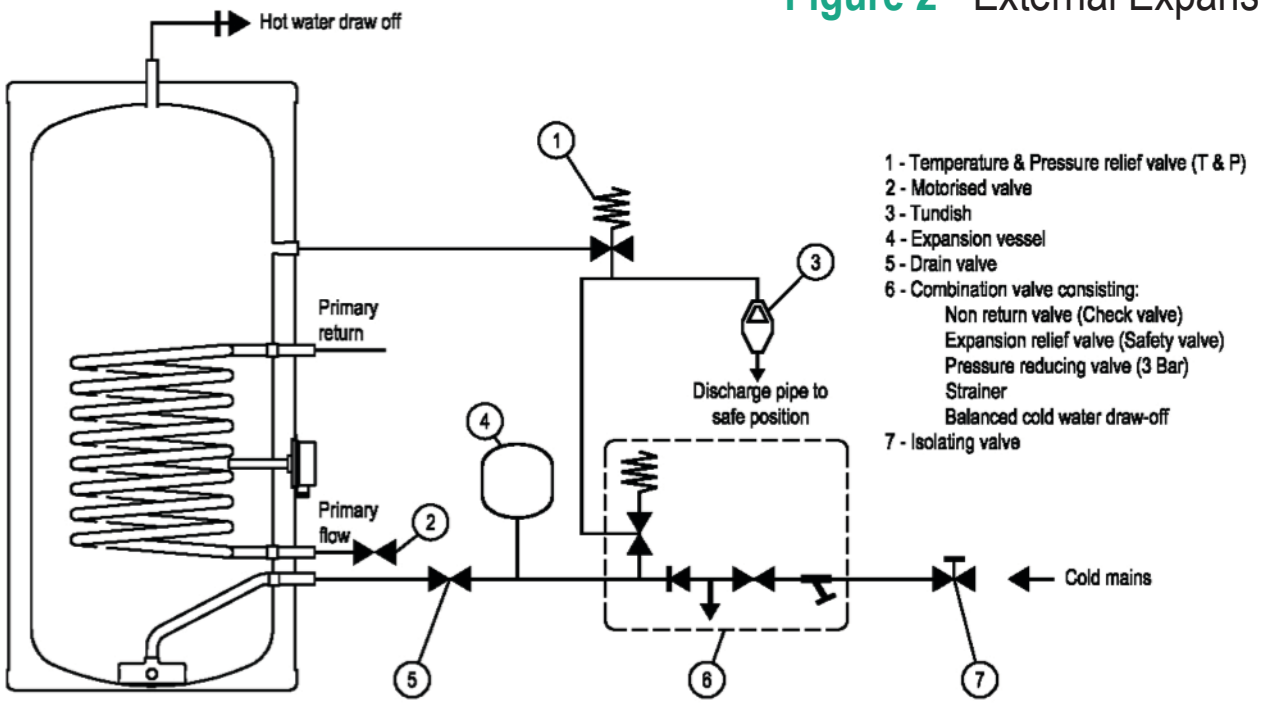
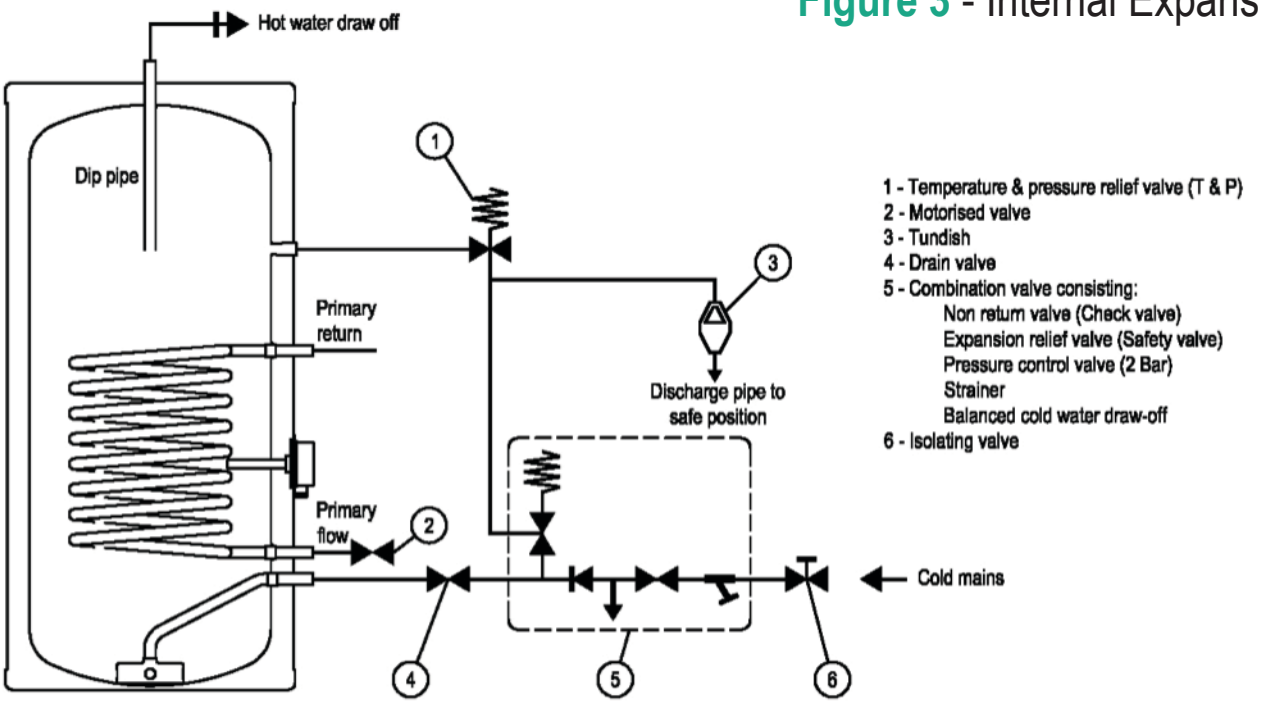


Figure 3 - Internal Expansion



3.2 Recommended Installation Schematics

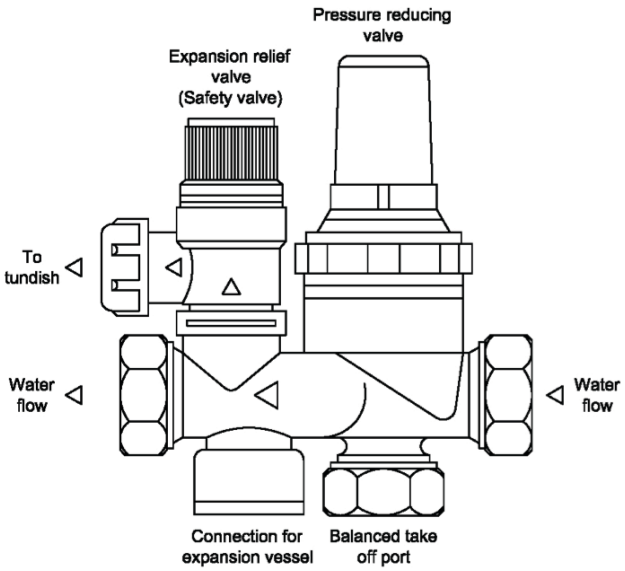


Figure 4 - Combination Valve

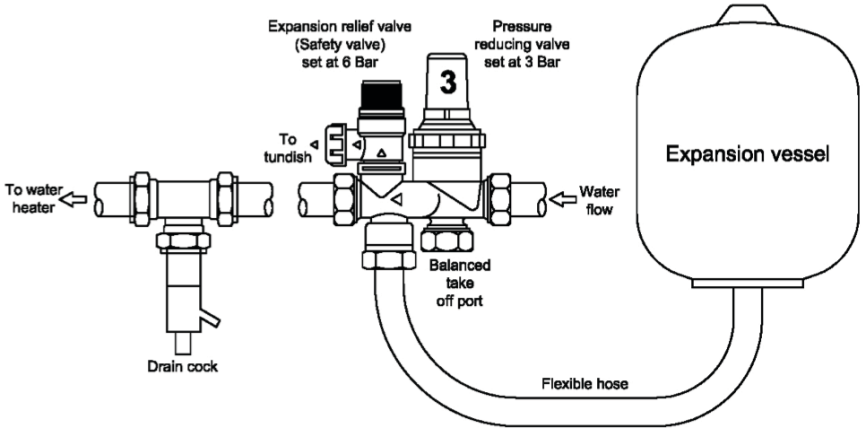


Figure 5 - Inlet Group, External Expansion

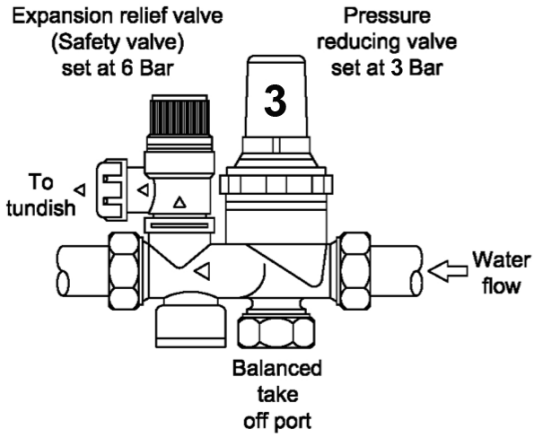


Figure 6 - Inlet Group, Internal Expansion

3.3 Wiring Diagrams

All wiring must be carried out by a competent person in accordance with I.E.E. wiring regulations

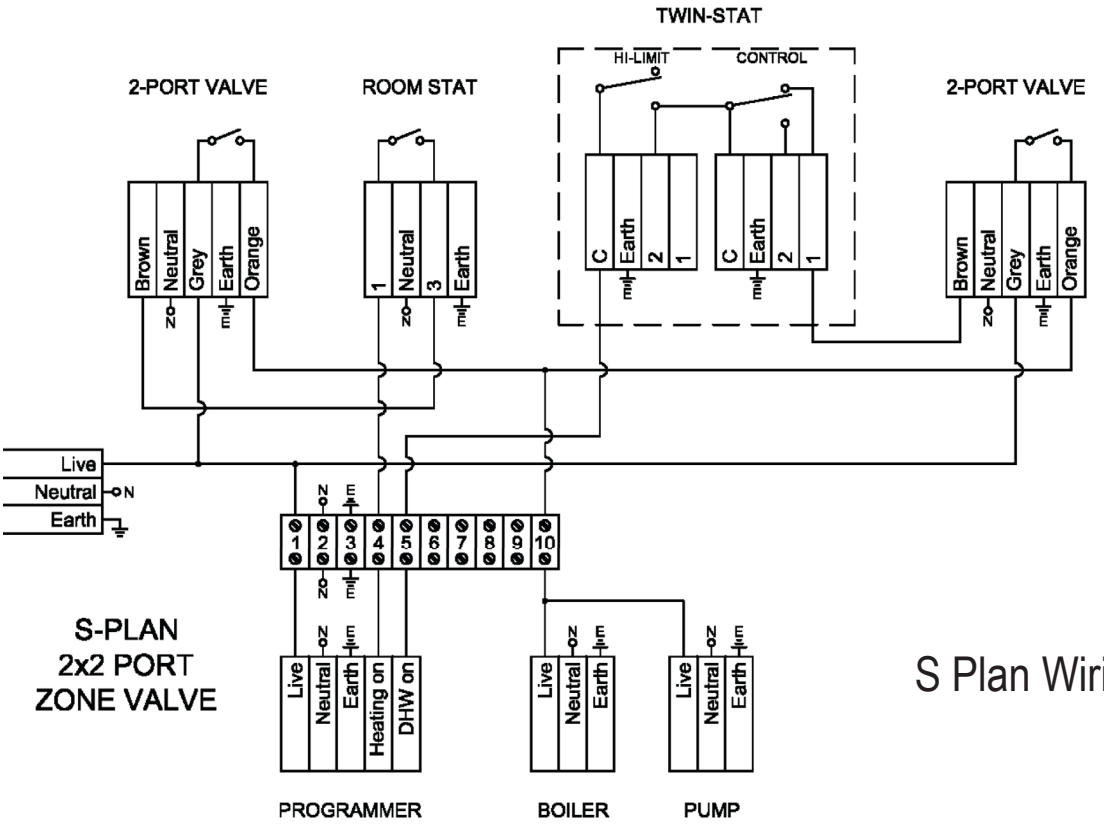


Figure 7
S Plan Wiring Diagram

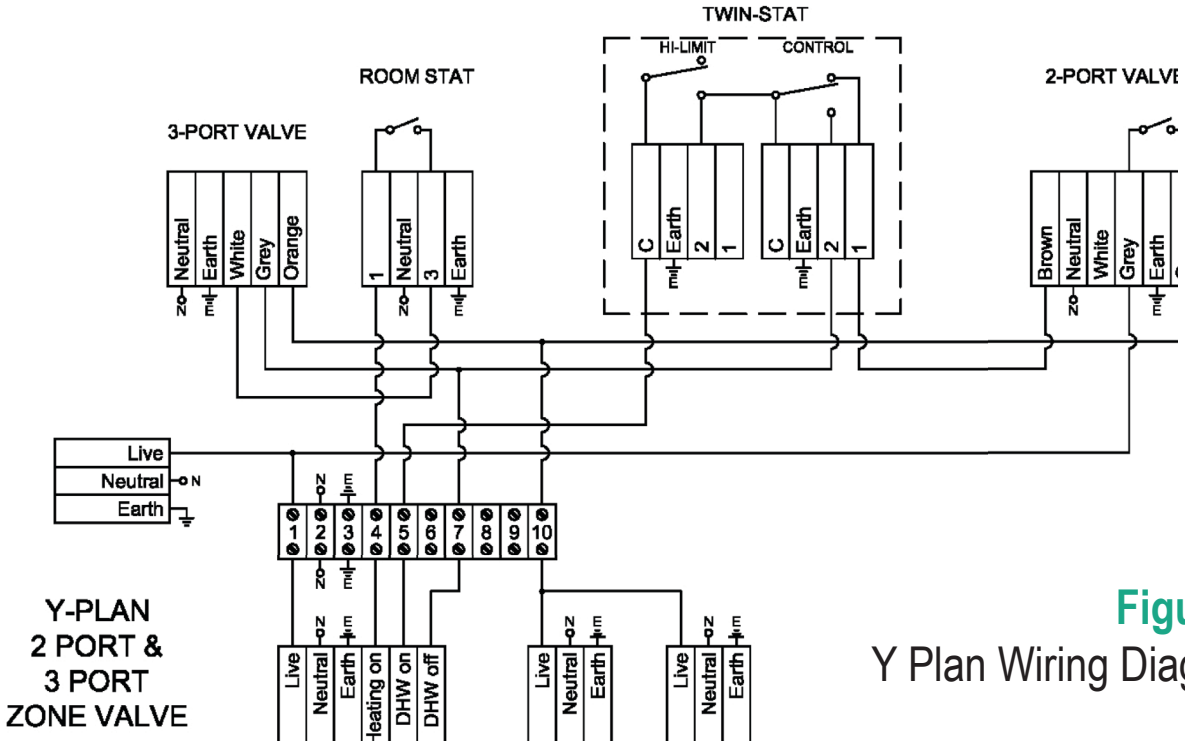


Figure 8
Y Plan Wiring Diagram

3.4 Immersion Heaters

Fitting the immersion heaters

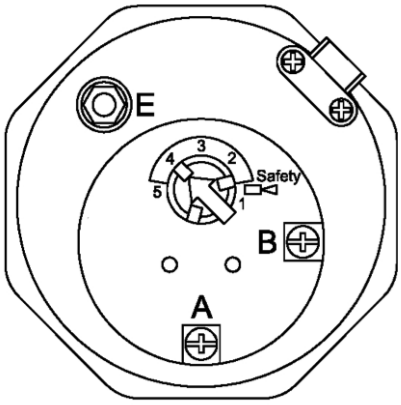
The heating element is fitted with a control thermostat which allows the water temperature to be set and a thermal cut-out for safety (see Figure 9). The unit is designed to screw into the 1¾" boss fitted to the unit. An 'O' ring is supplied as the seal and must be fitted against the flange of the element. Take care not to cross thread and DO NOT use any other type of seal.

Replacement elements can be obtained through your authorised service agent.

IMPORTANT: ENSURE THAT THE IMMERSION HEATER THERMOSTAT IS SET TO A MAXIMUM OF 60°C. WE RECOMMEND THE DEFAULT POSITION OF 55°C.

Figure 9 - Immersion Heater Connections and Control Thermostat Settings

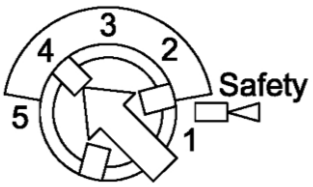
The immersion heater must be wired by a competent person in accordance with I.E.E wiring regulations.
The immersion heater must be earthed (for the 3kW immersion heater, a 13 amp fuse is required)



Key (connections):
A Live terminal
B Neutral terminal
E Protective Earth (PE) terminal

Key (approximate thermostat settings):
1 16°C
2 35°C
3 45°C
4 55°C (preset position)
5 68°C (+/-3)

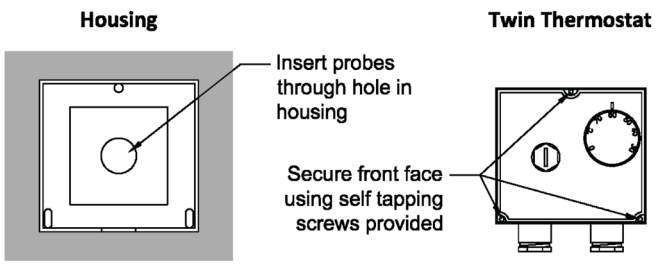
Safety: 85°C (+/-5)



Immersion heater specification - 3kW, 1 3/4" BSP thread, length 14"
Conforms to BS EN 60335-1 & 2

Figure 10 - Cylinder Thermostat & Thermal Cut-out Connections

Fitting the twin thermostat (refer also to wiring diagrams on page 17)

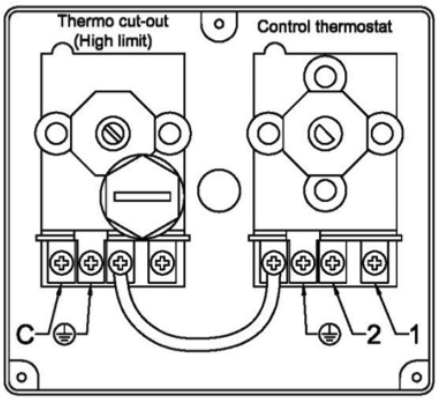


3.5 Motorised Valve

Two Port Valve

The two port valve should be wired to the thermostat (see Figure 7 or 8 depending on required configuration). Connect the live supply to the thermo cut-out and connect the brown wire of the two port valve to terminal 1 on the thermostat (see Figure 11). Earth and Neutral supplies can be connected directly to the valve. The orange wire of the two port valve should be connected to the central heating boiler and the cylinder thermostat set to 60°C. The power supply to the pump station should be connected via the lower valve.

Figure 11 - Twin thermostat wiring



3.6 Tundish

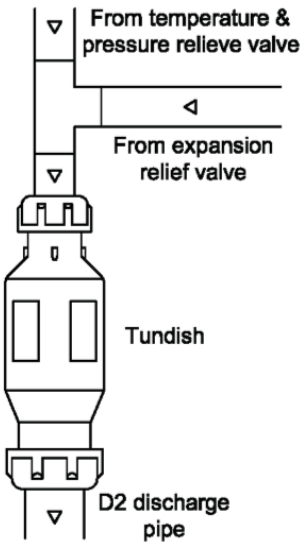


Figure 12 - Tundish Installation

IMPORTANT: REGULAR CHECKS SHOULD BE CARRIED OUT TO ENSURE THAT THE EXPANSION VESSEL IS ALWAYS CORRECTLY PRESSURISED TO 3.5 BAR.

The tundish supplied must be fitted so it is visible to the occupier. The discharge pipe must be 22mm copper pipe. Between the temperature & pressure relief valve and the first 90-degree bend there must be a fall of at least 300mm. The fall of the pipework must be continuous and the pipe should terminate in the gully or be bent backwards onto an outside wall, in a place where discharge cannot be injurious to persons.

If you need to site the Excelsior unit in the middle of the house your discharge pipe to the tundish can be as far away as 9m, which in most cases is enough to run the final discharge point. After 9m, increase the pipe size to a greater diameter than 22mm and accordingly for subsequent 9m lengths, (see table 1).

3.7 Discharge Pipe

G3 Requirement

'...there shall be precautions...to ensure that the hot water discharged from safety devices is safely conveyed to where it is visible but will not cause danger to persons in or about the building.'

G3 Guidance Section 3.5

The discharge pipe (D1) from the vessel up to and including tundish is generally supplied by the manufacturer of the hot water storage system. Where otherwise the installation should include the discharge pipe(s) (D1) from the safety device(s).

In either case the tundish should be vertical, located in the same space as the unvented hot water storage system and be fitted as close as possible to, and lower than, the safety device, with no more than 600mm of pipe between the valve outlet and the tundish (See Figure 13).

The discharge pipe (D2)

The discharge pipe (D2) from the tundish should:
Have a vertical section of pipe at least 300mm long below the tundish before any bends in the pipework (see Figure 13).

Be installed with a continuous fall of at least 1 in 200 thereafter.

The discharge pipe (D2) should be made of metal or other material that has been demonstrated to be capable of safely withstanding temperatures of the water discharged and is clearly and permanently marked to identify the product and performance standard (e.g. as specified in the relevant part of BS 7291-1:2006 Thermostatic pipes and fittings for hot
and cold water for domestic purposes and heating installations in buildings, General Requirements).

Termination of discharge pipe

The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge.

Examples of acceptable discharge arrangements are:
To a trapped gully with the end of the pipe below a fixed grating and above the water seal.
Downward discharges at low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.

Discharges at high level: e.g. into a metal hopper and metal downpipe with the end of the discharge pipe clearly visible or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering system that would collect such discharges.

The discharge would consist of high temperature water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

Worked Example of Discharge Pipe Sizing

The example below is for a G1/2 temperature relief valve with a discharge pipe (D2) having 4 No elbows and length of 7m

from the tundish to the point of discharge. See table on page 21.

Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from G1/2 temperature relief valve is 9m. Subtract the resistance for 4 No 22mm elbows at 0.8m each = 3.2m, therefore the permitted length equates to 5.8m.
This is less than the actual length of 7m therefore calculate the next largest size.

Maximum resistance allowed for a straight length of 28mm pipe (D2) from a G1/2 temperature relief valve equates to 18m. Subtract the resistance of 4 No 28mm elbows at 1m each = 4m.

Therefore the maximum permitted length equates to 14m. As the actual length is 7m a 28mm (D2) copper pipe will be satisfactory.

3.7 Discharge Pipe

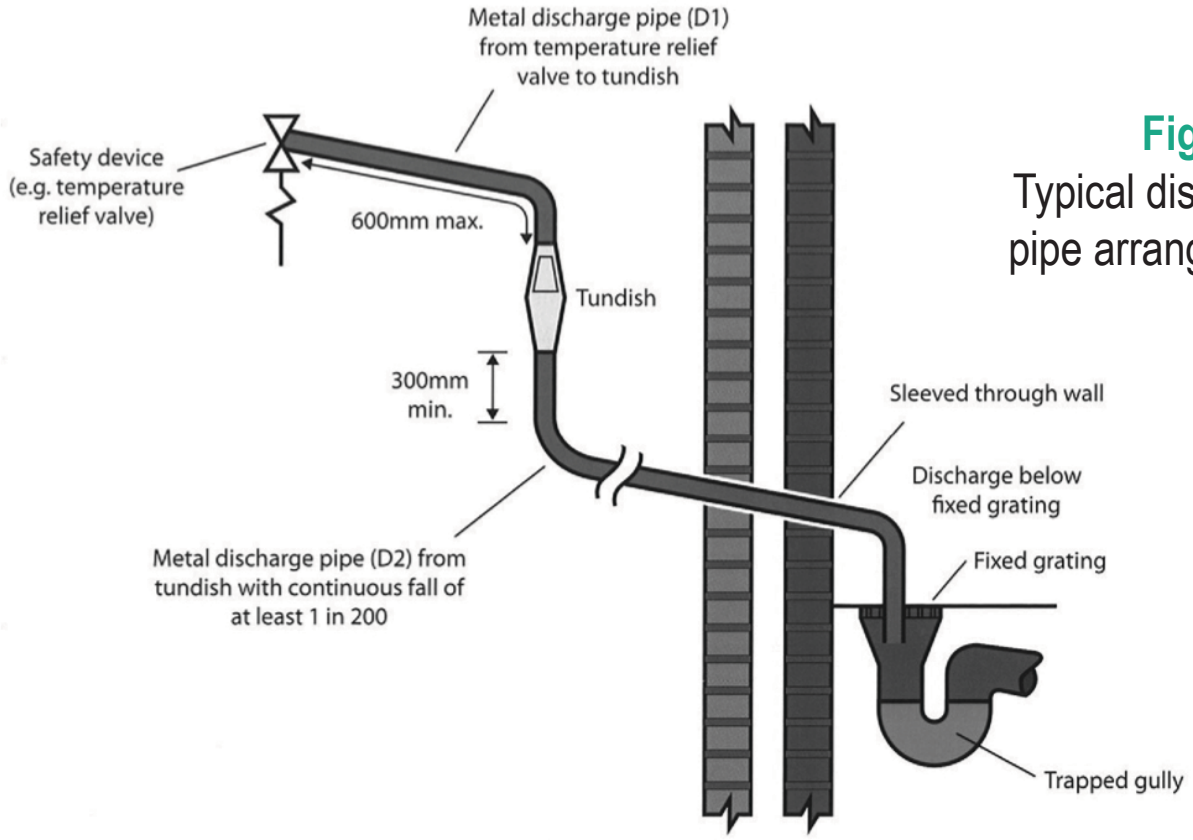


Figure 13
Typical discharge pipe arrangement

IMPORTANT: THE DISCHARGE WILL CONSIST OF SCALDING WATER AND STEAM. ASPHALT, ROOFING FELT AND NONMETALLIC RAINWATER GOODS MAY BE DAMAGED BY SUCH DISCHARGES.

3.7.1 Sizing of copper discharge pipe (D2) for common temperature & pressure relief valve sizes

Valve outlet size	Minimum size of discharge pipe D1	Minimum size of discharge pipe D2	Minimum resistance allowed, expressed as a length of straight pipe (i.e. no elbows or bends)	Resistance created by each elbow or bend
G ½	15mm	22mm	up to 9m	0.8m
		28mm	up to 18m	1.0m
		35mm	up to 27m	1.4m
G ¾	22mm	28mm	up to 9m	1.0m
		35mm	up to 18m	1.4m
		42mm	up to 27m	1.7m
G 1	28mm	35mm	up to 9m	1.4m
		42mm	up to 18m	1.7m
		54mm	up to 27m	2.3m

3.8 Variable Air Gap Device

This device is an improvement to unvented water heating installations.

In accordance with B.S. 7206: 1990 to accommodate for the expansion of the water as it is heated inside the water tank an external pressurized expansion vessel is coupled to the tank.

Over a period of time the expansion vessel will lose its charge & will have to be re-pressurized. An alternative to fitting an expansion vessel is to arrange for a volume of air to be provided above the water level inside the water heater (internal expansion). This will eliminate the need for the external expansion vessel & reduces installation time.

The tendency with internal expansion is over a period of time for the air to be absorbed by the water. When this happens a procedure needs to be carried out to manually replace the air in the vessel.
The patented Air Gas Device automatically re-charges the air gap, thus extending the life of the air gap, in the vessel every time the water is drawn off by the user

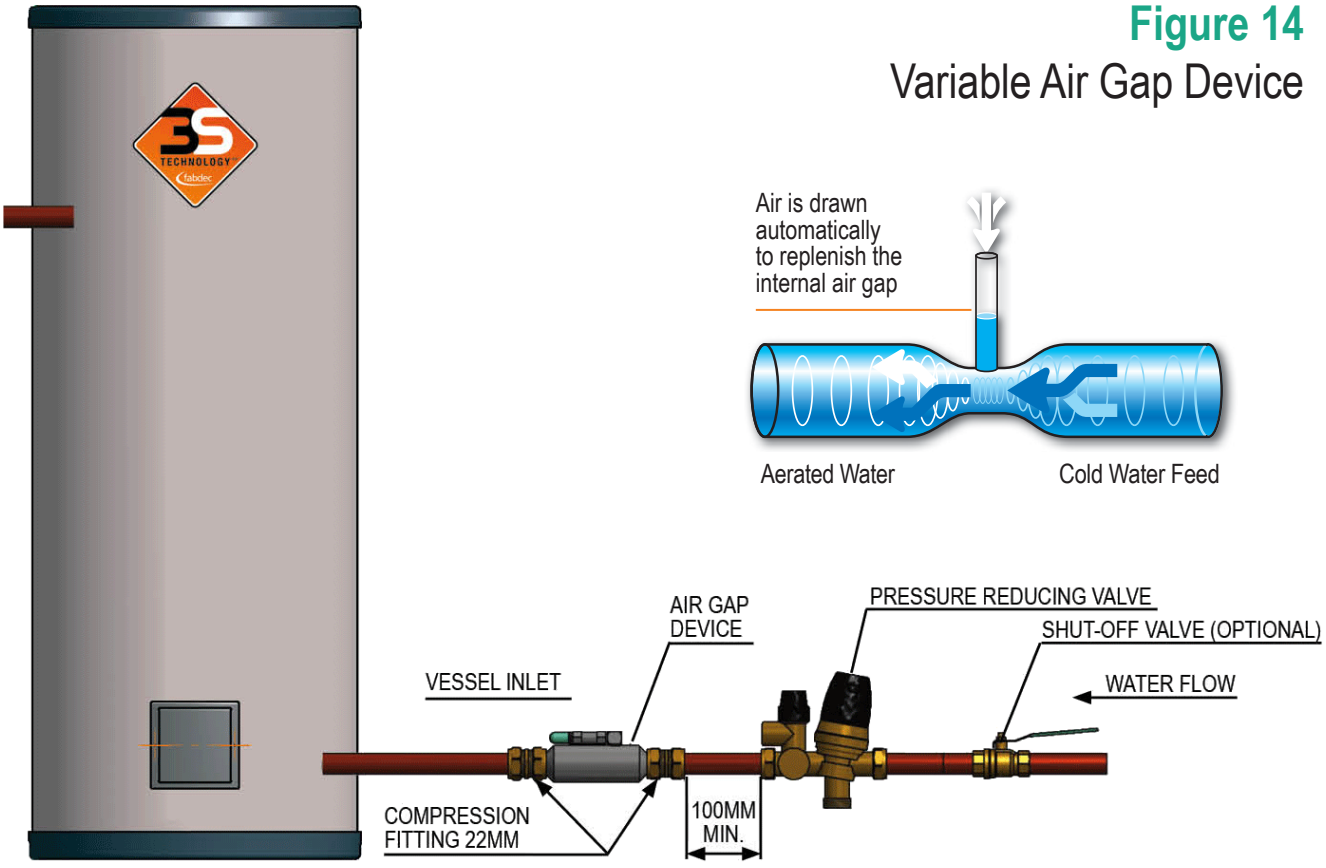
Attention - all work to an existing operating system should be carried out by a suitably qualified installer.

The air gap device is fitted on the water inlet between the pressure reducing valve and the cylinder per diagram below. Ensure that a minimum of 100mm pipe length exists between the compression fitting on the Air Gap Device and the pressure reducing valve.

For ease of maintenance you may wish to add in a water inlet shut off valve before the pressure reducing valve.

The Air Gap Device can be mounted vertically or horizontally.

Figure 14
Variable Air Gap Device



Section 4
Commissioning

4.1 Essentials

Checking the water supply

1. Before turning on the mains supply to the cylinder, a hot water tap should be opened, preferably on the same floor or the floor below where the cylinder is located.
2. Turn on the main supply and allow the vessel to fill. Allow water to flow through the open hot water tap for a few minutes to flush through any residue there may be in the vessel / pipework.
3. Close the hot water taps and bring the cylinder up to working pressure.
4. Check all vessel connections and pipework for leaks.

Draining

Switch off electrical power to the immersion heaters and/or shut down the boiler. Close the stopcock valve to isolate the Excelsior unit.

Attach a hosepipe to the drain cock having sufficient length to take water to a suitable discharge point.

Open the drain cock.

Open the hot water tap nearest to the Excelsior unit. If water fails to drain from the Excelsior unit, vent the system by opening the temperature and pressure relief valve.

Scale

Limescale build-up is increased in hard water areas. Limiting the water temperature to 60°C will help reduce excessive build-up on the heating element.

If a water softener is used it should be capable of flows of approximately 50Ltrs/min, this will maintain maximum performance of the Excelsior unit.

If no descaler or softener is used then the heating element(s) will need descaling periodically for maximum efficiency and to prevent damage.

User Instructions

Your Excelsior unvented hot water cylinder has been designed to give many years of trouble free service and is made from hygienic, high grade stainless steel. Where applicable, it includes a 3kW electric immersion heater which heats the water to 60°C once pre-heating of the solar system is completed (Excelsior Solar only).

The flow temperature of the hot water can be set to your requirements on the immersion heater (ideally 60°C maximum). Higher temperatures can cause tripping of the high limit thermostat and introduce more energy loss from the cylinder.

When a hot tap is turned on there may be a short surge of water, this is quite normal with unvented systems and does not mean there is a fault.

When you first fill a basin the water may sometimes appear milky. This is due to very tiny air bubbles in the water which will clear very quickly.

Warning: if cold/warm water exits from the temperature and pressure relief valve (TPV) or from the pressure relief valve (PRV) call your installer or the excelsior customer service centre. If very hot water exits from either valve switch off the heat source immediately and isolate the electricity supply to the cylinder and separate heat source.

The solar system is configured to heat the water to its maximum economic temperature which may vary with ambient temperature and weather conditions. The immersion may be programmed to operate during fixed periods of the day or night.

If the hot water runs cool it may be necessary to manually switch on the immersion to heat the water . Please see the relevant instructions for your alternative energy device.

4.2 Commissioning Checklist

This Commissioning Checklist is to be completed in full by the competent person who commissioned the storage system as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name _____ Telephone Number _____

Address _____

Cylinder Make and Model _____

Cylinder Serial Number | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Commissioned by *(print name)* _____ Registered Operative ID Number _____

Company Name _____ Telephone Number _____

Company Address _____

_____ Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certificate*:

Building Regulations Notification Number *(if applicable)* _____

ALL SYSTEMS PRIMARY SETTINGS (indirect heating only)

Is the primary circuit a sealed or open vented system?	Sealed ☐	Open ☐	
What is the maximum primary flow temperature?			°C

ALL SYSTEMS

What is the incoming static cold water pressure at the inlet to the system?				bar
Has a strainer been cleaned of installation debris (if fitted)?	Yes ☐	No ☐		
Is the installation in a hard water area (above 200ppm)?	Yes ☐	No ☐		
If yes, has a water scale reducer been fitted?	Yes ☐	No ☐		
What type of scale reducer has been fitted?				
What is the hot water thermostat set temperature?				°C
What is the maximum hot water flow rate at set thermostat temperature (measured at high flow outlet)?				l/min
Time and temperature controls have been fitted in compliance with Part L of the Building Regulations?			Yes ☐	
Type of control system (if applicable)	Y Plan ☐	S Plan ☐	Other ☐	
Is the cylinder solar (or other renewable) compatible?	Yes ☐	No ☐		
What is the hot water temperature at the nearest outlet?				°C
All appropriate pipes have been insulated up to 1 metre or the point where they become concealed			Yes ☐	

UNVENTED SYSTEMS ONLY

Where is the pressure reducing valve situated (if fitted)?				
What is the pressure reducing valve setting?				bar
Has a combined temperature and pressure relief valve and expansion valve been fitted and discharge tested?	Yes ☐	No ☐		
The tundish and discharge pipework have been connected and terminated to Part G of the Building Regulations			Yes ☐	
Are all energy sources fitted with a cut out device?	Yes ☐	No ☐		
Has the expansion vessel or internal air space been checked?	Yes ☐	No ☐		

THERMAL STORES ONLY

What store temperature is achievable?		°C
What is the maximum hot water temperature?		°C

ALL INSTALLATIONS

The hot water system complies with the appropriate Building Regulations	Yes ☐
The system has been installed and commissioned in accordance with the manufacturer's instructions	Yes ☐
The system controls have been demonstrated to and understood by the customer	Yes ☐
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer	Yes ☐

Commissioning Engineer's Signature _____

Customer's Signature _____

(To confirm satisfactory demonstration and receipt of manufacturer's literature)

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

Section 5

Warranty

Flexiheat Ltd guarantee the immersion(s) and controls for a period of 1 year from date of purchase, excluding any failure caused by limescale, providing that they have been installed for their intended use by a competent person and have not been modified in any way.

In addition, Flexiheat guarantees domestic stainless steel inner hot water cylinders for a period of 25 years and commercial cylinders for 5 years from the date of purchase against faulty material or manufacture provided that:

1. The vessel has been installed by a competent person in accordance with this manual and all current regulations and codes of practice in place at the time of installation.
2. It has been used solely for the purpose of heating potable water that complies with current (at the time of installation) EU and UK standards and is not fed with water from a private source.
3. It had not been modified in any way.
4. It has not been subjected to excessive pressure or electrolytic action from dissimilar materials, or attack from any salt deposits.
5. It has been installed indoors in a frost-free environment.
6. The cylinder is connected to a public water supply maintained by a local water authority.
7. The warranty card is completed and returned to Flexiheat within 90 days of installation.
8. The unit has been serviced annually.
9. The log book has been filled in after each annual service.

This warranty is not transferable and does not include claims due to frost or lime scale damage.

This guarantee does not cover a procedure of flushing the system not in accordance to the WRAS guidelines pertaining to BS 6700.

Proof of purchase will be required for any claim. This guarantee does not affect your statutory rights.

Section 6

Service & Maintenance

Servicing and maintenance should only be carried out by a competent unvented hot water installer.

Before any work is carried out on the installation, it must be isolated from the electricity supply. Both the primary and secondary systems will contain very hot water that will scald, therefore care should be taken when opening any joints, seals or valves.

Only use spare parts authorised by Flexiheat. The use of other parts will invalidate the warranty.

WXI models offer a self-sustaining system known as 3S technology. The air gap is maintained during normal water usage.

This product should be serviced regularly to optimise its safety, efficiency and performance. The service engineer should complete the relevant Service Record on the checklist after each service.

Replacing air gap if lost during service (internal air gap – no expansion vessel fitted):

1. Turn off the mains supply to the unvented hot water cylinder
2. Open a hot water tap, preferably on the same floor or the floor below where the cylinder is located.
3. Operate the temperature and pressure relief valve until water stops flowing.
4. Close the hot water tap and the temperature and pressure relief valve.
5. Turn the mains supply back on and bring the cylinder up to working pressure.

Replacing air gap if lost during service (external air gap – expansion vessel fitted):

1. Turn off the mains supply to the unvented hot water cylinder
2. Open a hot water tap, preferably on the same floor or the floor below where the cylinder is located to relieve pressure.
3. Check pressure within expansion vessel. Re-pressurise to 3.0 bar if required.
4. Close the hot water tap.
5. Turn the mains supply back on and bring the cylinder up to working pressure.

Section 7

Service Records

It is recommended that your hot water system is serviced regularly and that the appropriate Service Record is completed by your service provider. Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Service 1: Date:
Engineer Name:
Company Name:
Tel. number:
Comments:

Signature:

Service 2: Date:
Engineer Name:
Company Name:
Tel. number:
Comments:

Signature:

Service 3: Date:
Engineer Name:
Company Name:
Tel. number:
Comments:

Signature:

Service 4: Date:
Engineer Name:
Company Name:
Tel. number:
Comments:

Signature:

Service 5: Date:
Engineer Name:
Company Name:
Tel. number:
Comments:

Signature:

Service 6: Date:
Engineer Name:
Company Name:
Tel. number:
Comments:

Signature:

Service 7: Date:
Engineer Name:
Company Name:
Tel. number:
Comments:

Signature:

Service 8: Date:
Engineer Name:
Company Name:
Tel. number:
Comments:

Signature:

Service 9: Date:
Engineer Name:
Company Name:
Tel. number:
Comments:

Signature:

Service 10: Date:
Engineer Name:
Company Name:
Tel. number:
Comments:

Signature:

Section 8

Fault Finding

WARNING: Disconnect electrical supply before removing any electrical equipment cover.

Fault	Possible Cause	Remedy
The cylinder cools down overnight	One pipe circulation in the case of short pipe networks with low pressure loss	Install a non-return valve as close as possible to the cylinder
Primary heating is not working. Boiler runs for a short period, goes off, then comes on again. This is repeated until the cylinder reaches its target temperature	Air trapped in heat exchanger Heat exchanger surface too small	Vent air from heat exchanger circuit Check data for boiler and cylinder. The problem may be solved by increasing the flow from boiler
Only cold or lukewarm water comes out of taps	Programmer set to heating only or not switched on for hot water Central heating boiler malfunction High limit thermostat has tripped Pump malfunction If only cold water comes out of taps, hot and cold pipes may have been connected up incorrectly	Set programmer to call for hot water on demand Check boiler operation. If faulty consult manufacturers instruction manual Check and re-set. The cause will need to be identified. Check wiring and/or plumbing connections Check connections and have them changed if necessary
Intermittent water discharge through tundish on warm up	Expansion vessel has lost its charge pressure (vessels with external expansion) Internal air gap needs replenishing	Follow steps listed in ‘Service & Maintenance’ Follow steps listed in ‘Service & Maintenance’
Continuous water discharge	Pressure reducing valve (PRV) not functioning properly Expansion relief valve not seating correctly Temperature & pressure relief valve not seating correctly	Check pressure from PRV. Replace cartridge if necessary Manually lift the valve once or twice to clear debris from the seat. If this does not cure problem, replace valve Manually lift the valve once or twice to clear debris from the seat. If this does not cure problem, replace valve

Section 9

Disposal

Disposal of packaging:
Those responsible for installing the cylinder are responsible for disposal of any transport packaging. Observe national regulations.

Cylinder disposal:
You must not dispose of the cylinder or any of its accessories in normal domestic rubbish. The cylinder and accessories must be disposed of in accordance with national regulations.

Recycling used parts:
Both the cylinder and transport packaging contain many recyclable parts.

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