

## Dorchester DR-FC Evo

- Condensing direct fired water heater
- Modulating, down firing burner
- Multiple temperature settings

**ULTRA  
QUIET**  
<45dB(A)



7 MODELS,  
CONTINUOUS OUTPUTS 600 - 2400L/H

up to  
**98%**  
Gross Seasonal  
Efficiency

Nat Gas  
LPG

**2**  
Yr  
Warranty

ErP  
Part L  
Compliant

**BIM**  
Objects

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## Intelligent and efficient

Featuring a modulating burner and condensing operation, the Dorchester DR-FC Evo water heaters provide a high efficiency DHW solution.

Intelligent built in controls enable you to use different hot water temperature settings during peak load and off peak periods to enhance energy saving condensing performance and reduce running costs.



## Suited to all buildings and applications

The Dorchester DR-FC Evo range of water heaters can be sized to suit many applications. Choose from 7 models with continuous outputs from 600 l/h to 2400 l/h and storage capacities from 227 to 504 litres. For large loads, multiple water heaters can be installed, and for a large hot water buffer, Hamworthy can offer a direct fired unit with additional storage tanks.

Meeting the strict standards for efficiencies and NOx emissions in new buildings and ultra-quiet operation enable the water heater to be installed close to point of use without disturbance to occupants.

A down firing pre-mix modulating burner reduces the risk of scale build up impacting on the heat

transfer. To protect the unit from corrosion, electrical anodes are fitted as standard.

With a wide range of flue options and very long flue runs (up to 100m), these water heaters offer flexibility in system design and can be sited almost anywhere in a building.

An easy to use control panel and backlit display provides the user interface to the water heater's comprehensive controls. Operating status, history, diagnostics, and service details can be displayed at the control panel or remotely via the optional remote monitoring unit.

## Key benefits



Intelligent built in controls



Low noise for installation close to occupants



Low NOx



Down-firing burner reduces impact of scale build up



Easy access for service and maintenance

## Key features:

- ⊗ Condensing, direct fired gas water heater
- ⊗ 7 models: 25, 30, 45, 60, 80, 95, 120kW
- ⊗ Continuous outputs 600 l/h to 2400 l/h
- ⊗ 3 storage capacity options: 227, 386 & 504 litres
- ⊗ Natural gas and LPG
- ⊗ Suitable for sealed systems
- ⊗ Up to 98% Gross Seasonal Efficiency

### Optional kits (Page 7-8)

- ⊗ Unvented supply kit
- ⊗ Top to bottom pump recirculation kit

### Controls (Page 12-13)

- ⊗ Temperature control and protection
- ⊗ 7-day timer control
- ⊗ Hysteresis control
- ⊗ Extra period operation
- ⊗ ON/OFF operation
- ⊗ Frost protection
- ⊗ Anti-legionella function
- ⊗ Pump control
- ⊗ Remote monitoring unit (optional)



### Flues (Page 16-20)

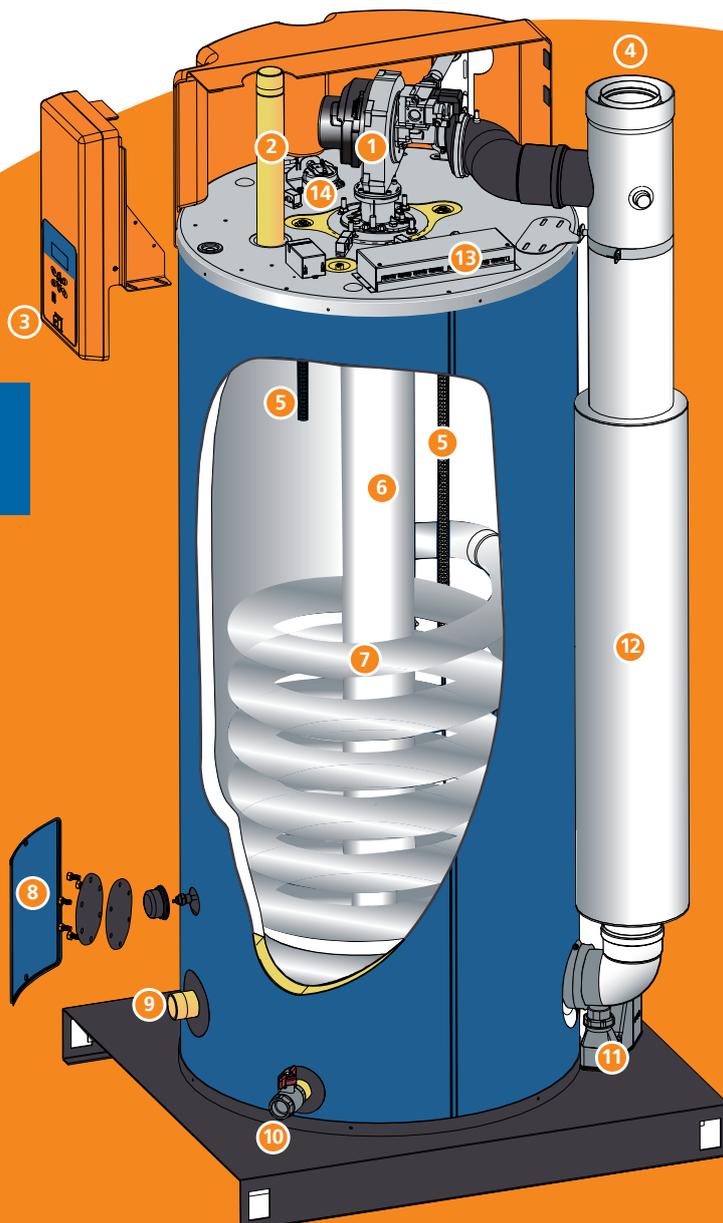
- ⊗ Horizontal or vertical flue terminal kit
- ⊗ B23 open flue systems
- ⊗ C13 concentric room sealed flue systems
- ⊗ C33 concentric room sealed flue systems
- ⊗ C53 twin duct room sealed flue systems

### Service & Warranty (Page 28)

- ⊗ 2-year warranty
- ⊗ Range of service options
- ⊗ Commissioning

## Anatomy of the Dorchester DR-FC Evo

- ① Down firing gas burner
- ② Hot water outlet
- ③ Control panel
- ④ Concentric flue connection
- ⑤ Electrical anodes
- ⑥ Combustion chamber
- ⑦ Heat exchanger
- ⑧ Inspection door
- ⑨ Cold water inlet
- ⑩ Drain valve
- ⑪ Condensate trap
- ⑫ Flue
- ⑬ Electrical connector block
- ⑭ Pressure switch



CONTINUOUS  
OUTPUTS

7

600-2400

MODELS LITRES/HOUR

# Technical data & dimensions

All Models

	Dorchester DR-FC Evo model	Units	DR-FC Evo 25	DR-FC Evo 30	DR-FC Evo 45	DR-FC Evo 60	DR-FC Evo 80	DR-FC Evo 95	DR-FC Evo 120
Energy	Building Regulations thermal efficiency gross	%	96	98	96	95	97	95	95
	ErP efficiency rating (modules ≤ 70kW only)	-	A	A	A	A	N/A	N/A	N/A
	Heating-up time, ΔT = 44°C	min.	23	37	24	20	19	16	13
	Heating-up time, ΔT = 50°C	min.	26	42	27	23	21	18	15
	Heating-up time, ΔT = 55°C	min.	29	46	30	25	23	20	16
	Standby losses	kW/24h	4.2	4.7	4.7	4.7	6.7	6.7	6.7
Water	Continuous output with 44°C ΔT	l/h	600	630	970	1200	1700	2000	2400
	1st hour output with 44°C ΔT	l	730	870	1300	1500	1900	2200	2600
	Continuous output with 50°C ΔT	l/h	530	560	850	1100	1500	1700	2100
	1st hour output with 50°C ΔT	l	630	730	1100	1300	1700	1900	2300
	Continuous output with 55°C ΔT	l/h	480	510	780	930	1300	1600	1900
	1st hour output with 55°C ΔT	l	560	640	930	1100	1500	1700	2000
	Storage capacity	litres	227	386	386	386	504	504	504
	Maximum operating water pressure (open vented)	bar	8	8	8	8	8	8	8
	Maximum operating water pressure (unvented)	bar	5.3	5.3	5.3	5.3	5.3	5.3	5.3
	Expansion relief valve setting (unvented kit)	bar	6	6	6	6	6	6	6
ErP load profile	-	XXL	XXL	XXL	XXL	3XL	3XL	3XL	
Nat Gas	Input, gross – maximum	kW	31.6	32.6	51.2	62.1	85	103.4	126.3
	Output – maximum	kW	30.5	32	49.3	59.3	82.6	98.7	119.4
	Gas inlet pressure – nominal	mbar	20	20	20	20	20	20	20
	Gas flow rate – maximum @1013.25 mbar and 15°C	m³/h	3.1	3.2	5	6	8.3	10.1	12.3
LPG	Input, gross – maximum	kW	31	32	50.1	60.8	83.2	101.2	123.6
	Output – maximum	kW	30.5	32	49.3	59.3	82.6	98.7	119.4
	Gas inlet pressure – nominal	mbar	37	37	37	37	37	37	37
	Gas flow rate – maximum@1013.25 mbar and 15°C	kg/h	2.3	2.3	3.7	4.4	6.1	7.4	9
Flue	Approximate flue gas volume @15°C, N.T.P. (Nat. Gas - G20)	kg/h	51.7	53.5	84.6	103.7	141.9	172.9	213.3
	Flue gas temperature – maximum	°C	45	50	60	65	50	55	60
	NOx emission, dry air free, European Class 5. Maximum (at part load)	mg/kWh	24	32	36	37	34	36	37
	Pressure at the flue outlet only (B23) with zero pressure at air inlet	Pa	52	62	133	173	88	126	180
Electrical	Start current–maximum (maximum power)	A (W)	0.59 (135)	0.59 (135)	0.59 (135)	0.59 (135)	0.61 (140)	0.61 (140)	0.61 (140)
	Run current–maximum (maximum power)	A (W)	0.2 (45)	0.2 (45)	0.32 (75)	0.5 (115)	0.41 (95)	0.63 (145)	1.05 (240)
	Electrical supply	Vac	230V 1PH 50Hz						
	Voltage tolerance	% of Vac	-15% +10%	-15% +10%	-15% +10%	-15% +10%	-15% +10%	-15% +10%	-15% +10%
Misc.	Noise level @2m from flue terminal	dB(A)	<45	<45	<45	<45	<45	<45	<45
	Number of (power) anodes	-	1	2	2	2	2	2	2
	Weight when empty	kg	196	239	239	239	405	405	405
	Approximate shipping weight	kg	215	260	260	260	426	426	426
	Maximum floor load/ weight filled with water	kg	423	625	625	625	909	909	909

CONTINUOUS  
OUTPUTS

7

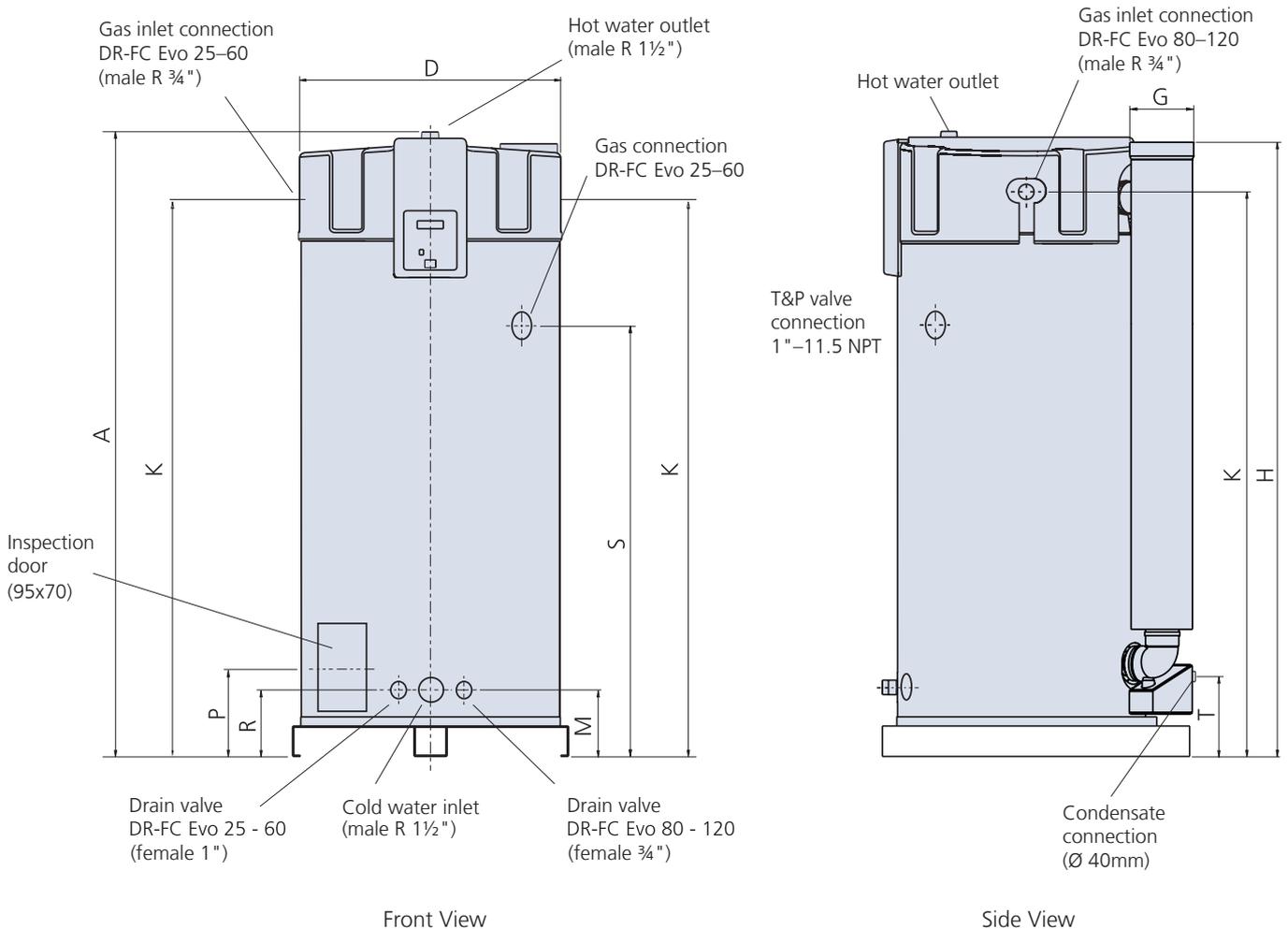
600-2400

MODELS LITRES/HOUR

# Dimensions

Dorchester DR-FC Evo

Ref.	Dimensions/mm	Water heater model						
		DR-FC Evo 25	DR-FC Evo 30	DR-FC Evo 45	DR-FC Evo 60	DR-FC Evo 80	DR-FC Evo 95	DR-FC Evo 120
A	Total height	1485	2015	2015	2015	2060	2060	2060
D	Water heater diameter	705	705	705	705	850	850	850
G	Diameter for flue gas discharge	100/150	100/150	100/150	100/150	130/200	130/200	130/200
H	Height of flue gas outlet/air supply	1460	1980	1980	1980	1995	1995	1995
K	Height of gas connection	1380	1910	1910	1910	1855	1855	1855
M	Height of cold water inlet	265	255	255	255	225	225	225
N	Height of hot water outlet	1485	2015	2015	2015	2060	2060	2060
P	Height of cleaning opening	265	270	270	270	290	290	290
R	Height of drain valve connection	180	170	170	170	225	225	225
S	Height of T&P valve connection	995	1505	1505	1505	1425	1425	1425
T	Height of condensation drain	245	245	245	245	240	240	240



Note: All dimensions in mm unless otherwise stated.

# Clearances

## Clearances

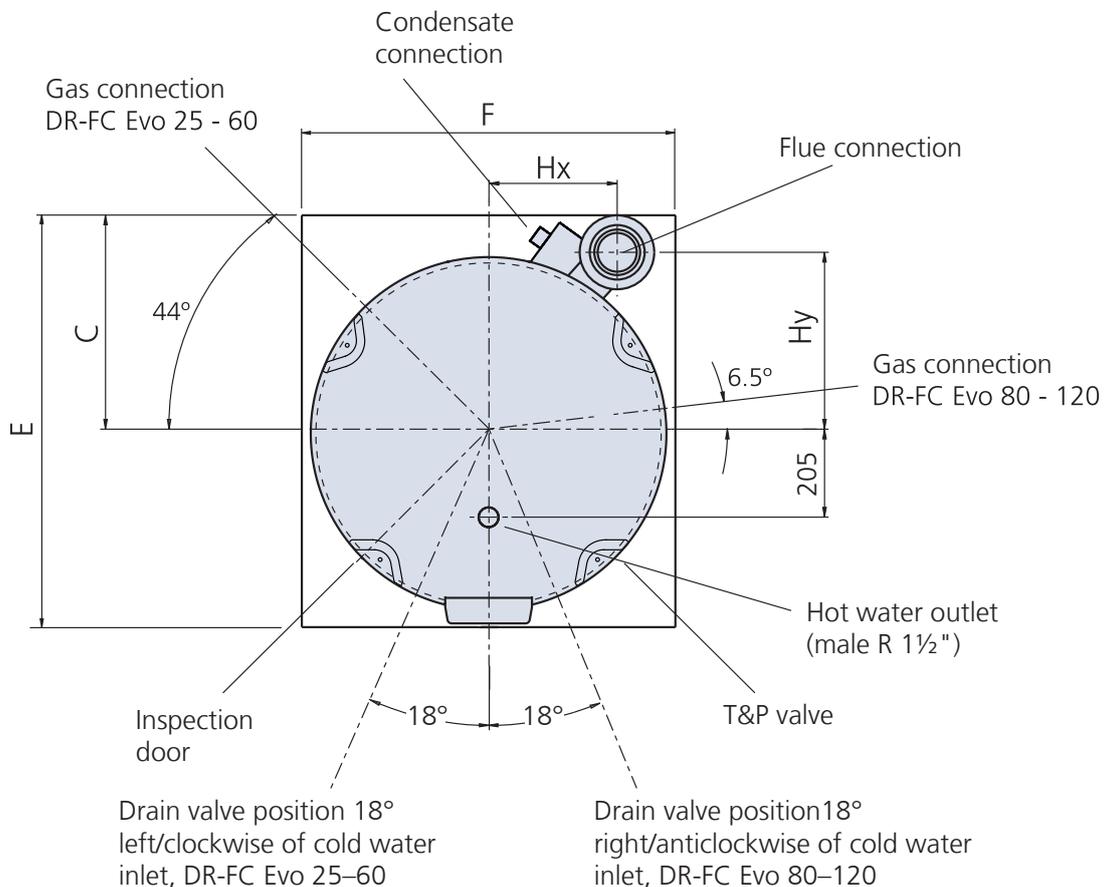
- ⦿ 1000mm above top of water heater
- ⦿ 1000mm around controls and inspection doors
- ⦿ 500mm around all other sides of water heater.

**Note:** Flue gas sampling point access must be restricted if the water heater is to be fitted in the corner of the room. If so, a loose sampling point adapter is available as an option, which can be fitting during installation at a more accessible position in the flue, as required.

## Ring base option

Models DR-FC Evo 25 to DR-FC Evo 60 inclusive are also available (as a special order) supplied fitted with a narrow galvanised steel ring base instead of a pallet base. In this configuration all height dimensions will be reduced by 95 mm for each applicable model.

Ref.	Dimensions/mm	Water heater model						
		DR-FC Evo 25	DR-FC Evo 30	DR-FC Evo 45	DR-FC Evo 60	DR-FC Evo 80	DR-FC Evo 95	DR-FC Evo 120
C	Position on base	490	490	490	490	530	530	530
E	Depth	925	925	925	925	1000	1000	1000
F	Width	850	850	850	850	900	900	900
Hx	x position flue gas outlet	265	265	265	265	310	310	310
Hy	y position flue gas outlet	375	375 <td 375	375	440	440	440	



**Note:** All dimensions in mm unless otherwise stated.

Plan View

# Recirculation kits

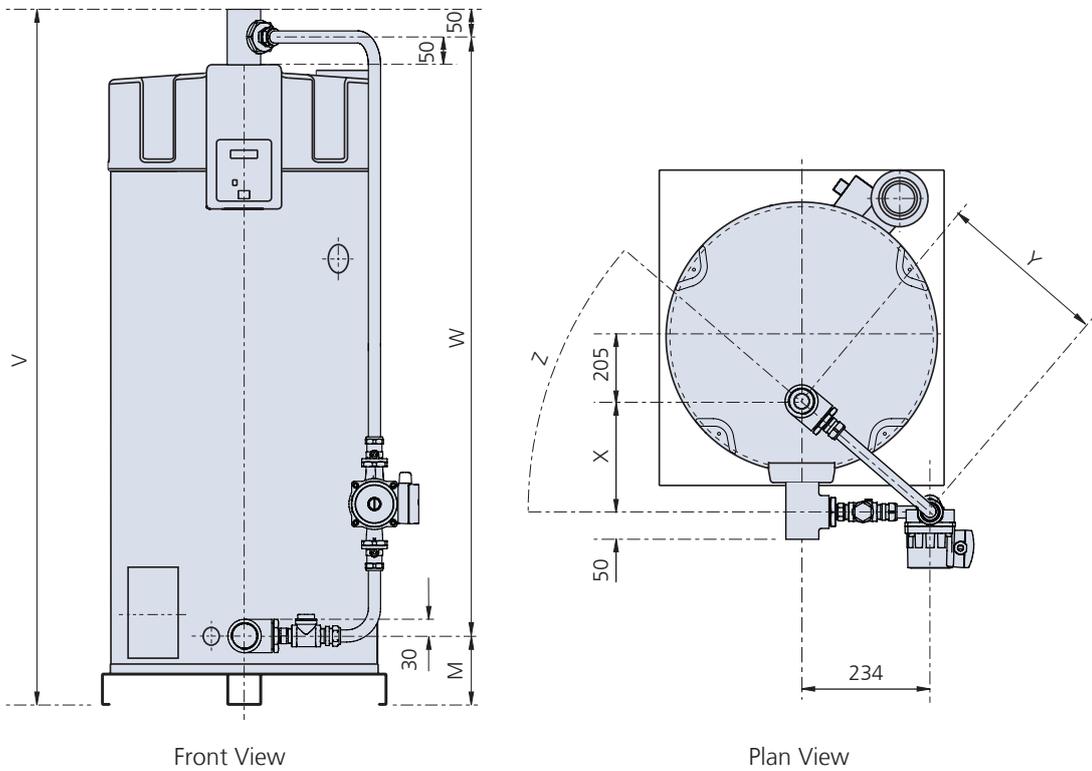
## Top-to-bottom recirculation kit (optional)

To prevent stratification within the heater, the optional top-to-bottom re-circulation kit should be specified. By constantly returning water from the flow back into the base of the heater, a uniform temperature is maintained. This recirculation can be timed to operate in parallel with the anti-legionella control function.



Watch our video to find out more on stratification at [www.hamworthy-heating.com/videos](http://www.hamworthy-heating.com/videos)

Ref.	Dimensions/mm	Water heater model						
		DR-FC Evo 25	DR-FC Evo 30	DR-FC Evo 45	DR-FC Evo 60	DR-FC Evo 80	DR-FC Evo 95	DR-FC Evo 120
V	Total height with recirculation kit	1576	2086	2086	2086	2141	2141	2141
W	Height (between pipe centres)	1261	1781	1781	1781	1866	1866	1866
X	Connections horizontal offset	214	214	214	214	316	316	316
Y	Pipe length	318	318	318	318	394	394	394
Z	Pipe angle/degrees	42°	42°	42°	42°	53°	53°	53°



Note: All dimensions in mm unless otherwise stated.

# Unvented kits

## Expansion vessel sizing calculation

Required expansion vessel volume ( $V_2$ ) can be calculated using the following formula:

$$\frac{V_2 = \Sigma \times V_1}{1 - P_c / P_w}$$

- Where
- $V_2$  = Required expansion vessel
  - $V_1$  = Total system volume (cylinder plus pipework)
  - $\Sigma$  = Water expansion factor
  - $P_c$  = Expansion vessel cushion pressure (absolute)
  - $P_w$  = Working pressure (absolute) = Expansion valve setting + 1 bar

## Basic pipework volume calculation

To calculate pipe volume for use in expansion vessel sizing calculation, use the formula:

$$\text{Volume (litres) per metre} = 0.0031428 \times r^2$$

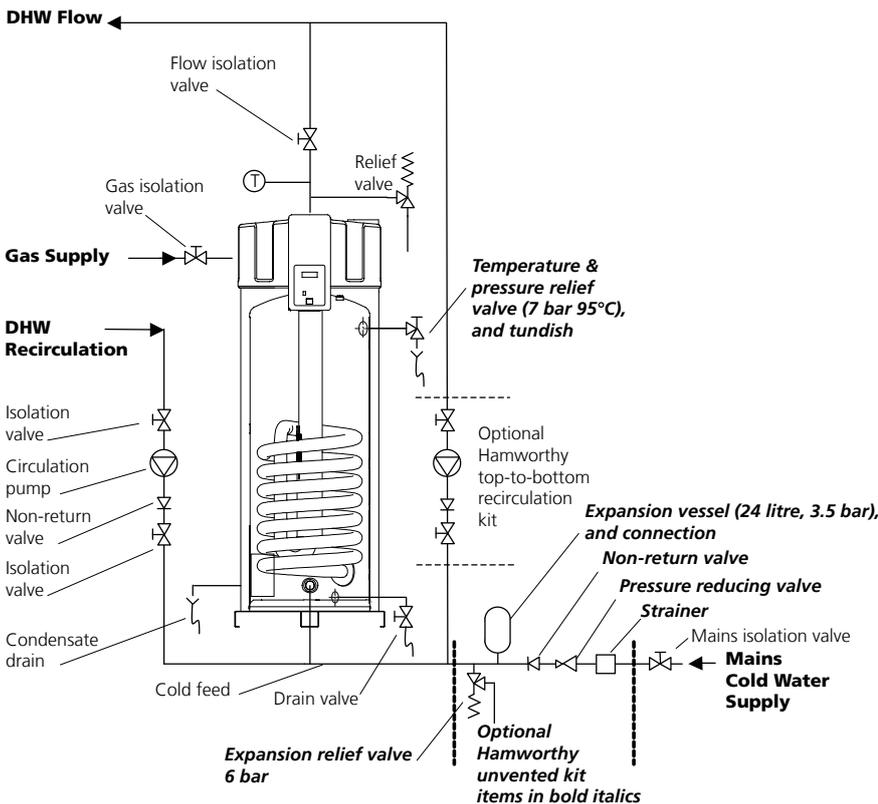
Where  $r$  = Internal radius =  $((\frac{1}{2} \times \text{Outside Diameter}) - \text{wall thickness})$ , in mm and  $L$  = length of pipe, in metres

### Example

For a 10m length of EN 1057 copper pipe, 22mm outside diameter, with wall thickness 0.9mm, the internal radius  $r = ((22/2) - 0.9) = 10.1$  mm.

$$\begin{aligned} \text{Volume of water per metre} &= 0.0031428 \times r^2 \\ &= 0.0031428 \times 10.1 \times 10.1 \\ &= 0.3206 \text{ litres/metre} \end{aligned}$$

Therefore total volume of water in 10m of pipe is  $10 \times 0.3206 = 3.206$  litres.



## Expansion factor for different water temperatures

Temperature °C	50	55	60	65	70
Expansion Factor $\Sigma$	0.0118	0.0142	0.0168	0.0196	0.0225

## Unvented kit (optional)

Each unvented supply kit is sized 1" and comprises the following items:

- ⊗ Strainer
- ⊗ Adjustable pressure reducing valve with tapping points for inlet and outlet pressure measurement
- ⊗ Non return valve
- ⊗ ¾" Expansion relief valve, 6 bar
- ⊗ Temperature and pressure relief valve, 7 bar, 95°C
- ⊗ 24 litre expansion vessel, 3.5 bar cushion pressure.

The optional unvented supply kit is essential for any unvented application and includes an expansion vessel sized for the water heater and local pipework only.

For large hot water systems or systems with additional storage tanks, additional expansion vessel capacity may be required.

The unvented supply kit allows the water heater to be fed directly from the mains water supply or boosted cold water supply, without the need for header tanks.

Each unvented supply kit is designed to be used with an individual water heater. Multiple water heater installations should be provided with one unvented supply kit per water heater.

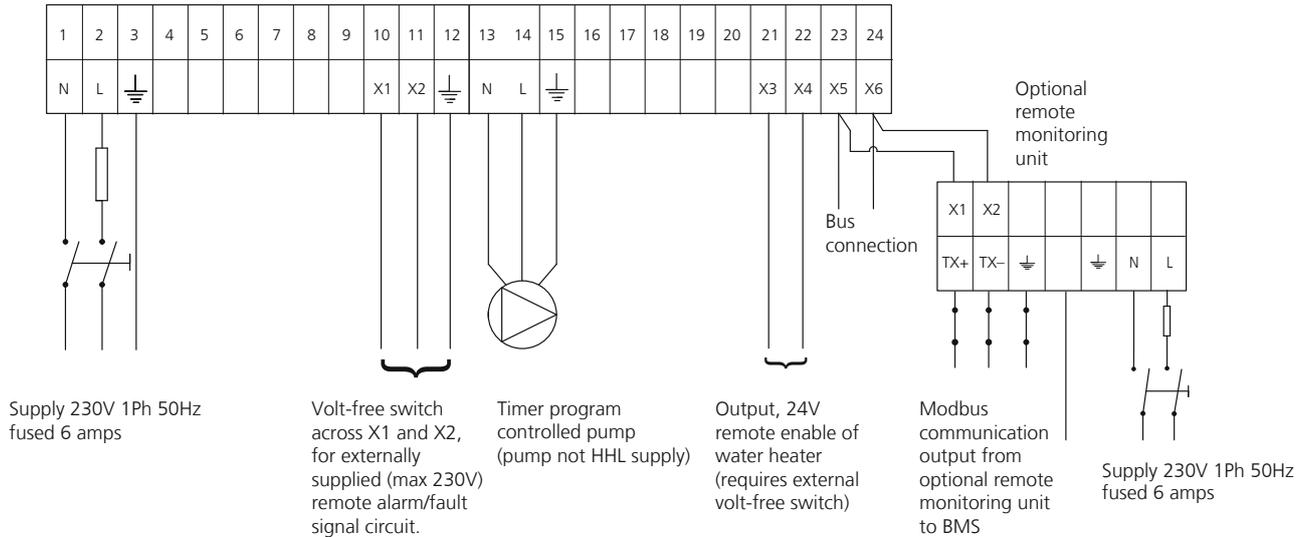
The kit contains all the essential components to comply with the Water Supply (water fittings) Regulations 1999, including a suitably sized pressure and temperature relief valve, which locates directly into the water heater.

# Electrical connections

The following electrical connections are provided on each water heater:

- ⦿ Supply live, neutral and earth
- ⦿ Alarm signal output (volt free contact)
- ⦿ Timer programmed pump output
- ⦿ Remote enable of water heater
- ⦿ Bus connection for optional remote monitoring unit.

## Control panel terminal block (top of water heater)



## Electrical connections

The electrical connection junction box is located within the upper casing section of the water heater to accept cables for power supply and controls. A single terminal rail is located within this junction box for all external connections.

### Power supply

An independent isolator and fused electrical supply is required for each water heater and remote monitoring unit for interfacing with a building management system (BMS). Supply 230volt, 50Hz, single phase.

Wiring external to the heater and any optional remote monitoring unit must be in accordance with IET regulations and any local regulations which apply. Wiring must be completed in heat resistant cables, and mains supply cables should be 3-core cable, size 1.00mm<sup>2</sup>. External fuses should be 6 Amp.

### Remote alarm/fault signal

In the event of the water heater developing a fault, a common alarm signal is raised, which closes a normally-open volt-free switch to connect terminals X1 and X2 together. This can be used to complete a circuit switching on an externally powered (maximum 230V) fault indication lamp or alarm circuit (not HHL supply). At the same time as the switch is made, an error code associated with the fault is generated and displayed at the control panel to aid fault diagnosis.

## Programmable timer-controlled pump

A 230V 50Hz single phase timer-controlled supply is provided for the direct control of a single pump only (maximum rating 150W) for system recirculation or top-to-bottom recirculation. If more than one pump is to be controlled at the same time by the water heater, then these should be supplied separately via contactors using the program controlled 230V power supply as the switching control signal. Pump operation can be co-ordinated to operate in tandem with the anti-legionella cycle as well as any programmed ON period.

### Remote enable

For external timer, BMS control, or remote manual control, each water heater can be controlled via a remote enable circuit, which, if enabled, switches ON the combustion heating circuit of the water heater, overriding the water heater's internal time clock program while ON.

The remote enable circuit operates at 24V supplied by the water heater with the water heater enabled when X3 and X4 are connected. Therefore any external control relay or switch wired across X3 and X4 must use volt-free contacts rated to 24V 1A with resistance no greater than 150Ω when closed. Wiring is not provided.

### Optional remote monitoring unit

Stored data can be made available to a BMS (Building Management System) via an optional Remote Monitoring Unit which act as an interface between the water heater controller and the BMS, converting the data into Modbus format.

The remote monitoring unit requires 230V, single phase 50Hz supply. Communication between the water heater remote monitor unit and BMS is via a 2-wire low-voltage communication bus.

# Specification

## Construction (1)

The water heater cylinders are constructed from high grade steel and coated with a high quality vitreous enamel lining. The fabrication of the cylinder and welding is completed fully before the glass lining is applied, ensuring that the integrity of the lining is not affected during manufacture.

On completion of the fabrication, the cylinder undergoes a precise glass coating process where the unit is rotated in every direction to ensure an even glaze is applied throughout. Surplus material is drained before the unit is baked at 840°C to complete the adhesion of the lining to all internal surfaces of the cylinder, providing a long-lasting finish. The cylinder is covered with a 50mm layer of CFC free foam insulation to ensure that standing losses are kept to a minimum.

## Burner (2)

The modulating pre-mix burner is mounted on top of the heater in a down firing arrangement. The controlled supply of gas and air achieves the optimum gas/air mixture for efficient performance and clean combustion.

The burner can modulate down to 40% of full power.

## Heat exchanger (3)

The hot combustion gases are directed down through the combustion chamber which extends to near the base of the tank then rises up the heat exchanger to a point where it forms a spiral which descends again, exiting at the flue connection near the base. This arrangement maximises heat transfer, as gases cooled by colder water lower down the tank start to condense. This condensation causes latent heat energy to be transferred to the cooler water, increasing the performance of the unit.

This design of the heat exchanger eliminates the problems traditionally associated with scale as any build-up will fall away to the base of the unit, and not affect heat transfer or create hot spots.

## Condensing effect

In the heat exchanger process, as the flue gases become cooler they pass into the lower layer of the tank where the cold-water inlet tops up the supply of water. This maximises the opportunity to condense, releasing the latent energy in the process.

The condensate in the flue gases is discharged via the condensate trap at the base of the unit.

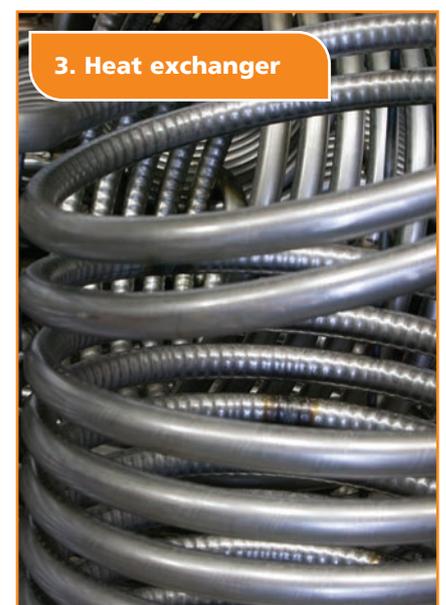
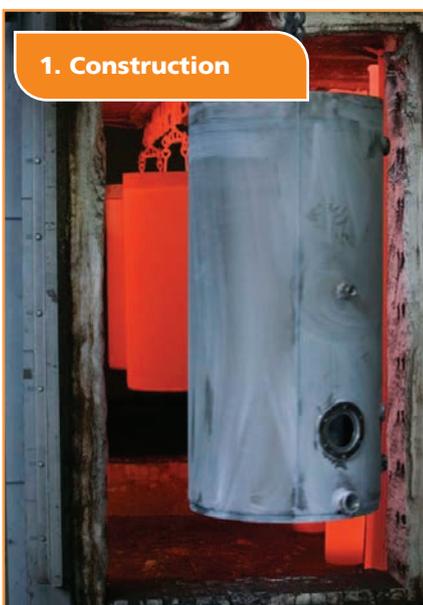
## Anode protection (4)

All models are fitted with electrical anodic corrosion protection as standard. This ensures excellent protection from corrosion, and is fully effective even with water supplies that have conductivity as low as 125 micro-siemens. Non-sacrificial anodes are used and these require no routine maintenance or replacement.

It is essential for the electrical anode protection system that power is maintained at all time. Any external time controls must use the remote enable connections and not interrupt the mains supply to the water heater. An interruptible power supply is recommended to ensure proper protection of the unit is maintained.

## Clean out door

The Dorchester DR-FC Evo models have an easily accessible clean out door that allows for the inspection and cleaning of the tank's interior, as required by the recommendations of the Health and Safety Commission (HSC) for the control of Legionellosis, including Legionnaires' disease.



## LPG fuels

All Dorchester water heaters are suitable for LPG fuel. The fuel type must be specified at the time of ordering. It is strongly recommended that on LPG installations, gas detection equipment is fitted and that this equipment is positioned near the heater and at low level. It is also imperative that the plant room is ventilated at high and low level.

The LPG variants of the Dorchester DR-FC Evo must not be installed in basement plant rooms.

## Flue connection

The flues gases exit the cylinder at the base of the unit and return to the top for connection into an adaptor to combine the incoming combustion air and discharging flue gases into a concentric connection.

## Flue system

The Dorchester DR-FC Evo water heaters are suitable for B23 open flue or C13, C33, and C53 room sealed applications. Room sealed flues can be discharged through horizontal or vertical concentric terminals. Twin duct systems are available for longer flue runs, up to 100m. Shorter runs can use concentric ducts up to 40m.

See pages 12-19 for flue system details.

## Open vented or unvented systems (5)

The water heaters are suitable for open vented water systems i.e. those fed typically via a header tank and float valve arrangement. They may also be used in unvented water systems fed directly from the mains cold water supply if an optional unvented water supply kit is used.

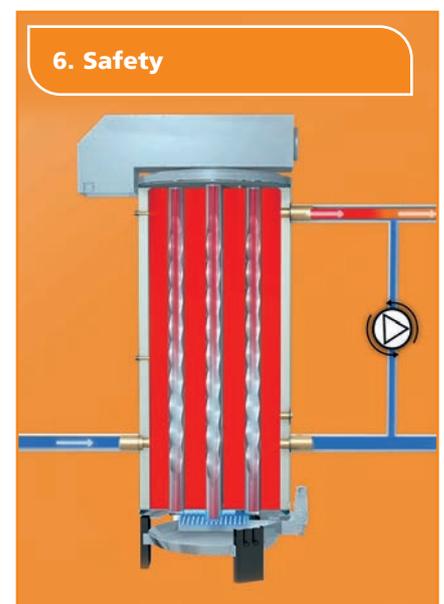
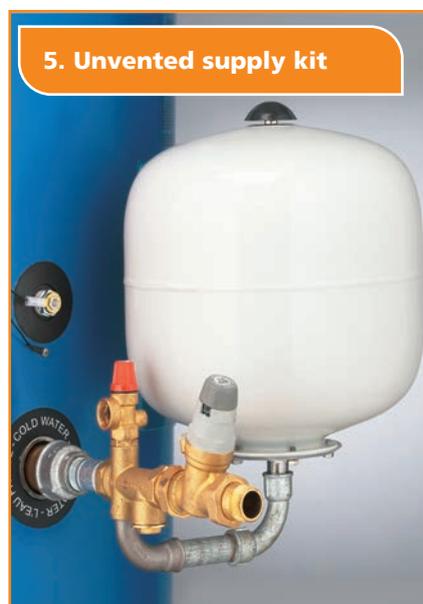
See page 6 for details of Hamworthy's unvented supply kit.

## Safety (6)

The HSC approved code of practice and guidance document L8, makes it clear that if the risk of Legionella is to be minimised, then the recommendations must be observed in so far as they relate to hot & cold-water systems.

Dorchester water heaters conform to these requirements as follows:

- ⊕ Good access for cleaning
- ⊕ Generous flow and return connections
- ⊕ Adequately sized drain
- ⊕ Base designed to avoid sludge traps
- ⊕ Anodes to reduce metal corrosion
- ⊕ Number of tappings correctly positioned to facilitate recirculation, destratification and to avoid stagnation
- ⊕ Designed to meet unvented supply requirements.



# Controls

The Dorchester DR-FC Evo range features advanced control capability through a digital control panel and backlit display with adjustable contrast, display illumination time and scroll speed. Settings can be programmed via the easy to use control panel. The display shows time and day, actual water temperature, programmed water temperature and next switching time, on or off. It can also display operating history, service diagnostics and alert to service due, based on operating hours.

Controller features include:

- ④ 7-day timer control mode
- ④ Hysteresis control
- ④ Extra period mode (override weekly program)
- ④ Continuous ON or OFF modes
- ④ Frost protection function
- ④ Anti-legionella function
- ④ Programmable external pump control
- ④ Data logging

## Temperature control and protection

Electronic temperature control manages accurate flow and storage temperatures. Temperature sensors are fitted towards the top and bottom of the unit to monitor temperatures within the unit and control heating closely for optimum performance.

- ④ Operating temperature set point range 40°C to 80°C
- ④ Intermediate limit temperature set point 88°C with auto reset
- ④ High limit temperature set point 93°C, requires manual reset
- ④ Frost protection temperature set point, 5°C

## 7-day timer control

The 7-day timer control function allows the Dorchester DR-FC Evo flexibility to be set up to operate at up to 3 periods per day (21 individual periods per week) and to the appropriate set temperature during those periods, in line with the applications demand cycle (refer to the example on page 13). For each individual period the following parameters are programmable: day of week, heater ON time, heater OFF time, target temperature (set point) and pump ON/OFF.

## Hysteresis control

Hysteresis controls allow the hot water heating cycle to be finely tuned. On heat rising cycle, a hysteresis setting will allow the water temperature to overshoot the set point by a programmable number of degrees before the heater switches off. On a heat falling cycle, another hysteresis setting will allow a few degrees undershoot below the set point before switching on the heater. Hysteresis up and hysteresis down settings are programmable and are used in balancing the need to prevent cycling against the need to continually maintain precisely the set point temperature.

## Extra period operation

In addition to the timer control's 21 programmable periods, an extra non-repeating period can be set up using the 'Extra Period' function. This operates the water heater to a programmed required temperature for a programmed period. The extra period overrides the timer program for its duration, and then the extra period settings are cleared on expiration.

## ON/OFF operation

Each water heater can be set to ON or OFF condition whereby the timer program is disabled and the heater remains in standby mode. If set to OFF, then frost protection remains active. It is therefore important that, during maintenance periods when the water is drained, provision is made for isolating the unit electrically to ensure non operation. During ON operation, the water heater switches on if the measured water temperature is less than the programmed temperature set point, and heats continuously until the water temperature reaches the set point.

## Frost protection

Dorchester DR-FC Evo water heaters are supplied as standard with a frost protection thermostat. When the ON/OFF switch on the control panel is in the OFF position, the frost protection system will initiate firing of the burner when the stored water temperature falls below 5°C to provide protection against freezing in the cylinder.

## Anti-legionella function

All Dorchester models are designed to meet the Health & Safety Commission (HSC) requirements for safe production of hot water, and in particular the control of Legionellosis.

Legionella bacteria are common in natural water sources and low concentrations may be present in many water systems. It is important that hot water services are designed and operated in such a way that these organisms are prevented from multiplying.

Water temperature is a significant factor in controlling the risk, with optimum conditions for bacterial growth occurring between 20°C and 45°C.

Regular cleaning of the system will help to avoid the build-up of sediments, which may harbour or provide nutrients for the bacteria.

Water stagnation may encourage the growth of biofilm, which can provide local conditions for the production of Legionella bacteria.

The Dorchester DR-FC Evo controls incorporate a specific anti-legionella safety function which can be set to perform a weekly anti-legionella purge cycle. This works by running the water heater for a period at a high temperature (default 65°C for one hour) to prevent the risk of legionella bacteria forming in the vessel.

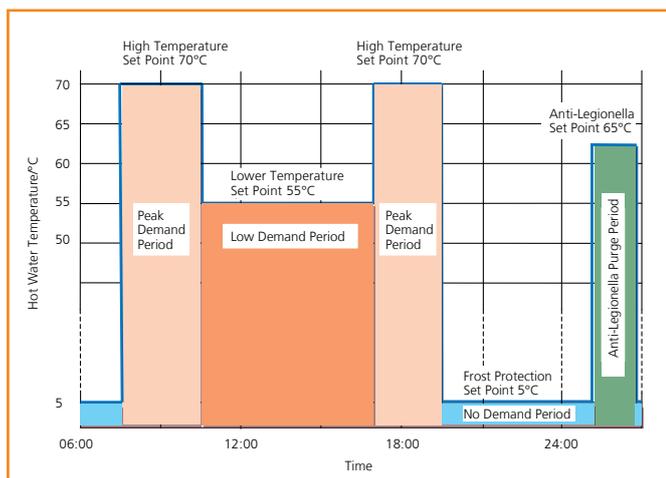
This can be set to run automatically during periods when hot water will not be used, for example to minimise the risk of scalding. It can also be set to run the system recirculation pump and/or the optional top to bottom recirculation kit pump concurrently with the legionella purge cycle to ensure that the whole system is purged.

## Flexible programmable timer controls

The Dorchester DR-FC Evo timer control features 21 programmable ON-OFF periods (3 periods per day/ 7 days per week), with an individual programmable thermostat set point per ON period. This allows efficient hot water schemes to be planned to suit the application, considering the required maximum draw-off at different times of the day, storage temperature safety philosophy and temperature required for maximum condensing operation.

In the example (see graph below) the storage temperature is set to 70°C during the 2 peak demand periods and at 55°C during the low demand period. In periods of no demand the water heater is set OFF. Frost protection is set at 5°C which will switch on the water heater, overriding the OFF period until the store temperature reaches 20°C to prevent water freezing. The anti-legionella cycle is programmed to run at night, once per week, heating the water to 65°C for at least 1 hour.

In the peak periods, setting to 70°C ensures demand can be met, both while the water heater is switched on and for an extended time after switching off, by using automatic mixing valves to mix with cold water at the taps down to the required temperature. During the low demand period, the set point is set to 55°C to prolong condensing operation of the water heater while still satisfying the maximum demand throughout the period.



## Pump control

The optional recirculation pump or a secondary circuit pump can be controlled via the pump ON/OFF control function associated with each timer period, or via the Pump ON/OFF control in the anti-legionella function. Both functions drive ON or OFF a single program-controlled 230V power supply output. This supply can be used for the direct control of a single pump only (maximum rating 150W).

If more than one pump is to be controlled at the same time by the water heater, then these should be supplied separately via contactors and controlled via the program controlled 230V power supply.

It is possible for a service engineer to set the timed pump output for permanent operation if desired.

## Data logging and optional remote monitoring unit

Water heater data such as burning hours, no. of ignitions, flame errors, and errors history (last 15 faults) are stored in the controller memory. These can be viewed on the controller, or at the BMS via the optional remote monitoring unit, which reformats the data into Modbus format for the BMS.



# Flues

## Maximum flue gas pressure for B23, C13, C33 and C53 type flue systems

The Dorchester DR-FC Evo water heaters are designed to operate as room sealed appliances or in open flue systems. Available with a choice of flue options using a range of matched components can provide versatility in where the water heater is located. Options are available for room sealed concentric or twin duct, or open flue single pipe arrangements.

Balanced flues can reduce the cost of installation and simplify flue runs. Room sealed configurations reduce the volume of ventilation air required, resulting in tighter and more energy-efficient buildings. Open flue applications provide solutions where balanced flue terminals are unsuitable, or where existing flue routes are to be retained.

Model	Maximum flue gas pressure			
	Outlet only (B23)		Inlet + outlet (C13, C33 and C53)	
	Pinlet /mbar	Poutlet/mbar	Pinlet /mbar	Poutlet/mbar
DR-FC Evo 25	0	0.52	-0.26	0.26
DR-FC Evo 30	0	0.62	-0.32	0.32
DR-FC Evo 45	0	1.33	-0.69	0.69
DR-FC Evo 60	0	1.73	-0.90	0.90
DR-FC Evo 80	0	0.88	-0.47	0.47
DR-FC Evo 95	0	1.26	-0.67	0.67
DR-FC Evo 120	0	1.80	-0.96	0.96

## Flue system construction

The flue system must be capable of handling saturated flue gases. Flue construction should be fully welded and CE marked for positive pressure application. All Hamworthy flue components have been matched and tested specifically for use with these water heaters. This ensures optimum performance from the installation and simplifies the necessary sizing calculations.

The flue is constructed from aluminium for twin duct and open flue arrangements (single wall) and for the inner wall of concentric flue components. The outer wall of concentric flue components is constructed from galvanised steel, with the concentric ring carrying the combustion air to the appliance, which also acts as the insulation to the inner duct, which carries the exhaust flue gases.

Flue pipes are joined with a simple push fit connection with a silicone seal ensures water and pressure tight joints every time and clamp bands complete the installation.

## Multiple appliance flue systems

It is suitable to install multiple Dorchester DR-FC Evo water heaters on a common flue. It is not suitable to install them on a combined flue with other appliances of a different burner type such as pressure jet or atmospheric boilers and water heaters.

Please refer to page 20 for more details.



The Jeremias Group is one of the leading manufacturers of flue systems and chimney systems in domestic and industrial applications worldwide.

Their history dates back to the early 70's with the discovery of a niche sector in relining chimney systems due to the use of new technologies in the heating sector.

The UK division was created in 2010 with a focus on providing the most reliable turn key service in the UK, combining the complete Know-How of the Jeremias group.

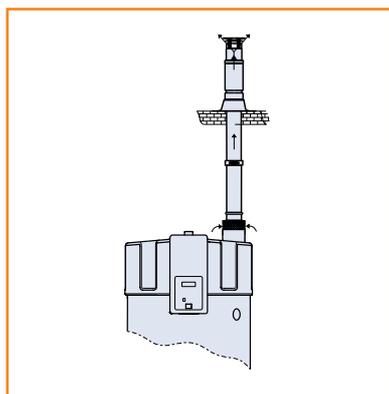
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[www.jeremias.uk](http://www.jeremias.uk)    01623 889219    [info@jeremias.uk](mailto:info@jeremias.uk)

# Type B23 open flue systems

Dorchester DR-FC Evo open flues are arranged for air supply directly from the plant room with vertical flue discharge. Ducting between the heater and the flue terminal is made using single tubes.

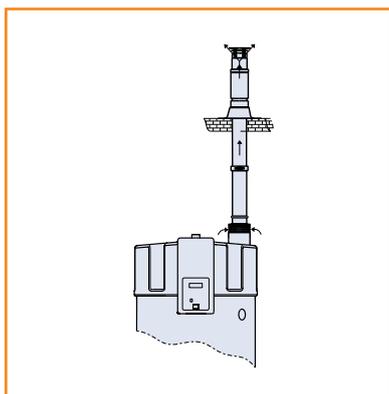
## Open flue with vertical flue terminal, type B23-A



Model	Diameter/mm	Maximum length/m	Elbow equiv. length/m	
			90°	45°
DR-FC Evo 25	100	55	4.6	1.2
DR-FC Evo 30	100	55	4.6	1.2
DR-FC Evo 45	100	55	4.6	1.2
DR-FC Evo 60	100	55	4.6	1.2
DR-FC Evo 80	130	65	2.4	1.4
DR-FC Evo 95	130	65	2.4	1.4
DR-FC Evo 120	130	65	2.4	1.4

## Open flue with enlarged diameter duct between heater and terminal, and vertical terminal, type B23-B

Where longer flue routes are required then it is possible to increase the diameter for the flue duct between the heater and the flue terminal. The final connection diameters at the heater and the flue terminal remain the same, so expansion and reduction pieces are used to facilitate the diameter change at each end of the flue pipe.

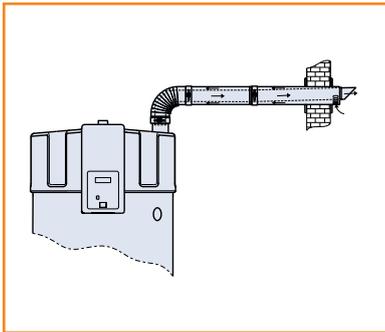


Model	Diameter/mm		Maximum length/m	Elbow equiv. length/m	
	Duct	Terminal		90°	45°
DR-FC Evo 25	100	100	100	2.4	1.4
DR-FC Evo 30	130	100	100	2.4	1.4
DR-FC Evo 45	130	100	100	2.4	1.4
DR-FC Evo 60	130	100	100	2.4	1.4
DR-FC Evo 80	150	130	100	2.6	1.6
DR-FC Evo 95	150	130	100	2.6	1.6
DR-FC Evo 120	150	130	100	2.6	1.6

# Type C13 concentric, room sealed flue systems

The Dorchester DR-FC Evo can be flued with horizontal discharge through concentric terminals. Ducting from heater to terminal can be made using concentric tubes.

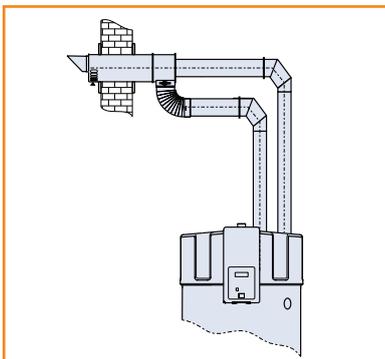
## Type C13 concentric, room sealed flue systems



Model	Diameter/mm	Maximum length/m	Max. no. of 45° or 90° bends
DR-FC Evo 25	100/150	40	7
DR-FC Evo 30	100/150	40	7
DR-FC Evo 45	100/150	40	7
DR-FC Evo 60	100/150	40	7
DR-FC Evo 80	130/200	15	4
DR-FC Evo 95	130/200	15	4
DR-FC Evo 120	130/200	15	4

## Parallel balanced flue with concentric horizontal terminal, type C13-B

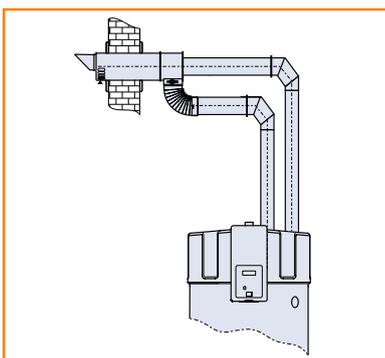
Where longer flue routes are required it is possible to use individual air supply and flue ducts heater converging at the concentric terminal, reducing the flue system resistance and permitting the extended length.



Model	Diameter/mm		Maximum length/m	Elbow equiv. length/m	
	Duct	Terminal		90°	45°
DR-FC Evo 25	100	100/150	55	4.6	1.2
DR-FC Evo 30	100	100/150	55	4.6	1.2
DR-FC Evo 45	100	100/150	55	4.6	1.2
DR-FC Evo 60	100	100/150	55	4.6	1.2
DR-FC Evo 80	130	130/200	65	2.4	1.4
DR-FC Evo 95	130	130/200	65	2.4	1.4
DR-FC Evo 120	130	130/200	65	2.4	1.4

## Enlarged parallel balanced flue with concentric horizontal terminal, type C13-C

If still longer flue lengths are required then it is possible to increase the diameter for the air supply and flue ducts between the heater and the terminal. The final connection sizes at the heater and concentric terminal remain the same, so expansion and reduction pieces are used to facilitate the size change at each end of both the air supply and flue pipe.

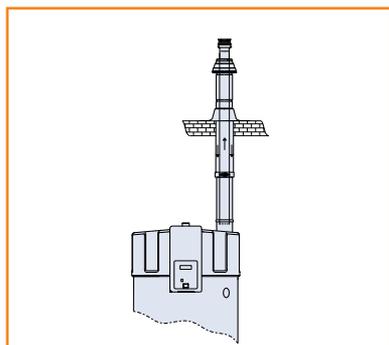


Model	Diameter/mm		Maximum length/m	Elbow equiv. length/m	
	Duct	Terminal		90°	45°
DR-FC Evo 25	130	100/150	100	2.4	1.4
DR-FC Evo 30	130	100/150	100	2.4	1.4
DR-FC Evo 45	130	100/150	100	2.4	1.4
DR-FC Evo 60	130	100/150	100	2.4	1.4
DR-FC Evo 80	150	130/200	100	2.6	1.6
DR-FC Evo 95	150	130/200	100	2.6	1.6
DR-FC Evo 120	150	130/200	100	2.6	1.6

# Type C33 concentric, room sealed flue systems

The Dorchester DR-FC Evo can be flued with vertical discharge through concentric terminals. Ducting from heater to terminal can be made using concentric tubes.

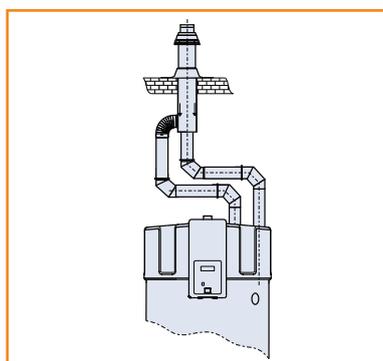
## Concentric balanced flue with vertical terminal, type C33-A



Model	Diameter/mm	Maximum length/m	Max. no. of 45° or 90° bends
DR-FC Evo 25	100/150	40	7
DR-FC Evo 30	100/150	40	7
DR-FC Evo 45	100/150	40	7
DR-FC Evo 60	100/150	40	7
DR-FC Evo 80	130/200	15	4
DR-FC Evo 95	130/200	15	4
DR-FC Evo 120	130/200	15	4

## Parallel balanced flue with concentric vertical terminal, type C33-B

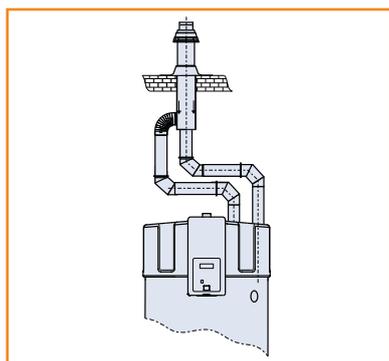
Where longer flue routes are required it is possible to use individual air supply and flue ducts heater converging at the concentric terminal, reducing the flue system resistance and permitting the extended length.



Model	Diameter/mm		Maximum length/m	Elbow equiv. length/m	
	Duct	Terminal		90°	45°
DR-FC Evo 25	100	100/150	55	4.6	1.2
DR-FC Evo 30	100	100/150	55	4.6	1.2
DR-FC Evo 45	100	100/150	55	4.6	1.2
DR-FC Evo 60	100	100/150	55	4.6	1.2
DR-FC Evo 80	130	130/200	65	2.4	1.4
DR-FC Evo 95	130	130/200	65	2.4	1.4
DR-FC Evo 120	130	130/200	65	2.4	1.4

## Enlarged parallel balanced flue with concentric vertical terminal, type C33-C

If still longer flue lengths are required then it is possible to increase the diameter for the air supply and flue ducts between the heater and the terminal. The final connection sizes at the heater and concentric terminal remain the same, so expansion and reduction pieces are used to facilitate the size change at each end of both the air supply and flue pipe

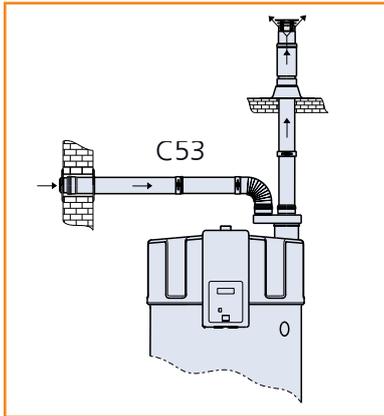


Model	Diameter/mm		Maximum length/m	Elbow equiv. length/m	
	Duct	Terminal		90°	45°
DR-FC Evo 25	130	100/150	100	2.4	1.4
DR-FC Evo 30	130	100/150	100	2.4	1.4
DR-FC Evo 45	130	100/150	100	2.4	1.4
DR-FC Evo 60	130	100/150	100	2.4	1.4
DR-FC Evo 80	150	130/200	100	2.6	1.6
DR-FC Evo 95	150	130/200	100	2.6	1.6
DR-FC Evo 120	150	130/200	100	2.6	1.6

# Type C53 twin duct, room sealed flue systems

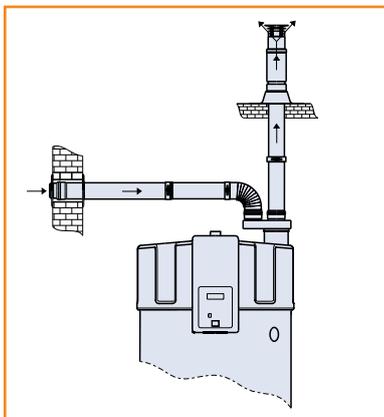
Dorchester DR-FC Evo room sealed flues can be arranged for horizontal air supply and vertical flue discharge. Ducting between the heater and the air/flue terminals is made using single tubes.

## Twin-duct horizontal air inlet with vertical flue terminal, type C53-A



Model	Diameter/ mm	Maximum length/m	Elbow equiv. length/m	
			90°	45°
DR-FC Evo 25	100	55	4.6	1.2
DR-FC Evo 30	100	55	4.6	1.2
DR-FC Evo 45	100	55	4.6	1.2
DR-FC Evo 60	100	55	4.6	1.2
DR-FC Evo 80	130	65	2.4	1.6
DR-FC Evo 95	130	65	2.4	1.6
DR-FC Evo 120	130	65	2.4	1.6

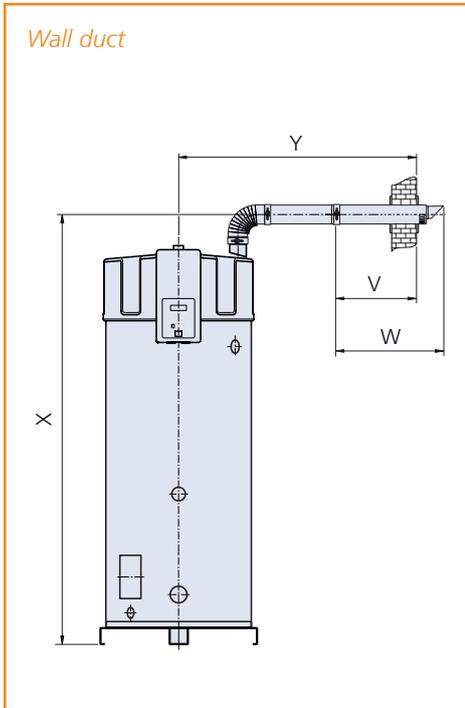
## Twin-duct horizontal air inlet with enlarged diameter duct and vertical flue terminal, type C53-B



Model	Diameter/mm		Maximum length/m	Elbow equiv. length/m	
	Duct	Terminal		90°	45°
DR-FC Evo 25	130	100	100	2.4	1.4
DR-FC Evo 30	130	100	100	2.4	1.4
DR-FC Evo 45	130	100	100	2.4	1.4
DR-FC Evo 60	130	100	100	2.4	1.4
DR-FC Evo 80	150	130	100	2.6	1.6
DR-FC Evo 95	150	130	100	2.6	1.6
DR-FC Evo 120	150	130	100	2.6	1.6

# Flue spacing requirements

Wall duct

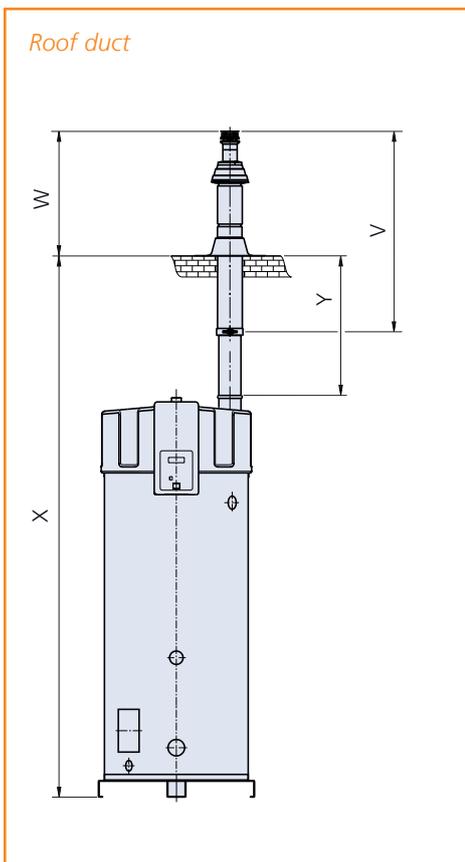


## Minimum space for wall duct

Model	Dimensions / mm					
	V	W	X	X*	Y	Y*
DR-FC Evo 25	550	790	1535	1985	1480	1030
DR-FC Evo 30	550	790	2075	2525	1480	1030
DR-FC Evo 45	550	790	2075	2525	1480	1030
DR-FC Evo 60	550	790	2075	2525	1480	1030
DR-FC Evo 80	640	940	2230	2680	1620	1170
DR-FC Evo 95	640	940	2230	2680	1620	1170
DR-FC Evo 120	640	940	2230	2680	1620	1170

\* Distance without concentric pipe between bend and wall duct.

Roof duct



## Minimum space for roof duct

Model	Dimensions / mm					
	V	W	X	X**	Y	Y**
DR-FC Evo 25	1500	1035	2965	2015	1415	465
DR-FC Evo 30	1500	1035	3325	2375	1415	465
DR-FC Evo 45	1500	1035	3325	2375	1415	465
DR-FC Evo 60	1500	1035	3325	2375	1415	465
DR-FC Evo 80	1730	1120	3620	2670	1560	610
DR-FC Evo 95	1730	1120	3620	2670	1560	610
DR-FC Evo 120	1730	1120	3620	2670	1560	610

\*\* Distance without concentric pipe between appliance and roof duct.

# Flue design for combined systems

## Multiple water heaters - same appliance types

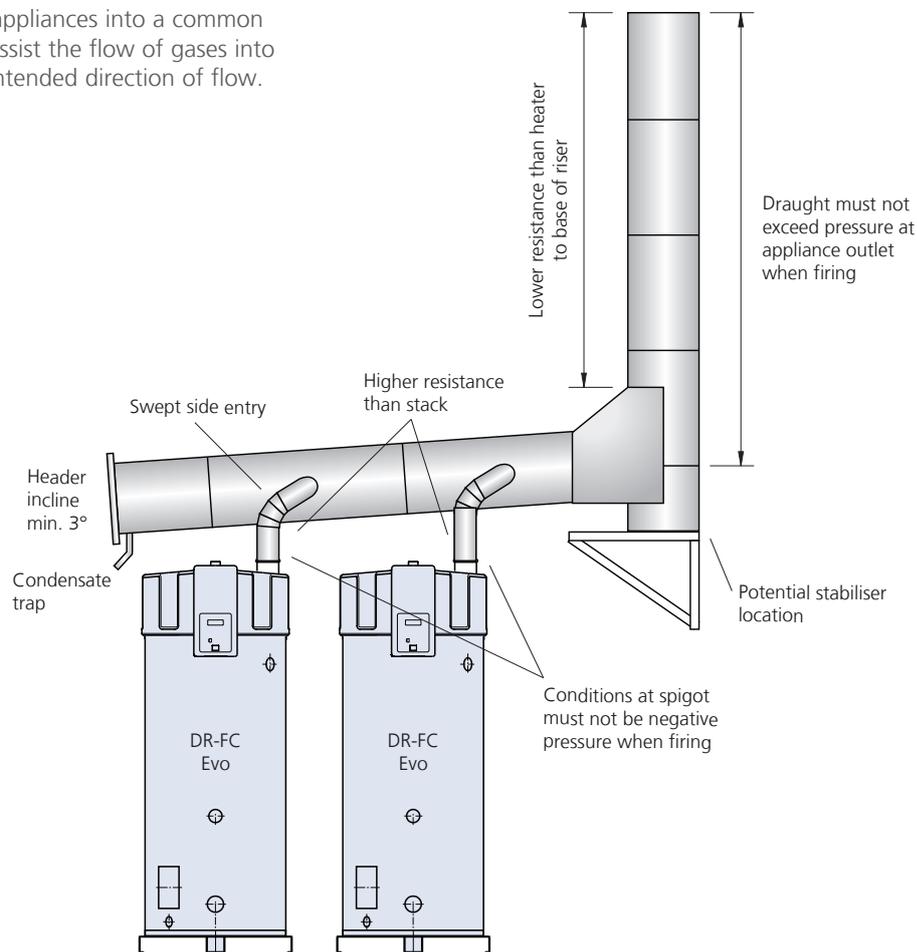
Dorchester DR-FC Evo water heaters may be used with common flue systems, and should be designed in accordance with current regulations.

These water heaters have a pressurised flue outlet, enabling a flue installation to be designed using smaller diameter components than with traditional atmospheric water heaters.

Multiple Dorchester DR-FC Evo water heaters may be installed using a common flue header. The use of swept connections from appliances into a common flue is recommended to assist the flow of gases into the common flue in the intended direction of flow.

The combustion circuit within Dorchester DR-FC Evo water heaters is not equipped with a back flow prevention device, it is therefore imperative that flue systems for multiple Dorchester DR-FC Evo water heaters are designed to prevent the possibility of flue gases from other heaters spilling through non firing water heaters.

*For advice on flue system design, please contact our technical support team: Telephone 01202 662500.*



## Flue installation

It is the responsibility of the installer to ensure, in practice, that products of combustion discharging from the terminal cannot re-enter the building or any other adjacent building through ventilators, windows, doors, other sources of natural air infiltration, or forced ventilation / air conditioning. If this should occur the appliance **MUST** be isolated from the gas supply and labelled as 'unsafe' until corrective action can be taken.

## Flue system design

Due to the high efficiency of these water heaters, the flue gas temperatures are low and the buoyancy in the stack will be relatively small. The water heater is supplied with an integral fan which is fully matched to the water heater in each case to provide correct combustion air flow and overcome the flue resistance. The power of this fan is such that there is a large reserve of pressure available to overcome a significant length of flue without affecting the combustion performance of the water heater. Care should be taken with tall flue systems to ensure excess buoyancy is not created. A negative pressure must not be created at the flue outlet.

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- **Wessex ModuMax mk3 boiler**
- **Upton boiler**



# Application and water system

## Location

The location chosen for the water heater must permit the provision of a satisfactory flue system and an adequate air supply. The location must also provide adequate space for servicing and air circulation around each unit. This includes any electrical trunking laid along the floor and to the appliance.

The water heater mounting surface should be a non-combustible flat and level surface capable of supporting the weight of the water heater when full of water and any additional ancillary equipment.

Any combustible material adjacent to the water heater and the flue system must be so placed or shielded to ensure that its temperature does not exceed 65°C.

Adequate space to enable installation and servicing should be provided, with due consideration to ensuring access to the clean out door and removal of the burner assembly.

## Layout

Dorchester DR-FC Evo water heaters are suitable for installation in either single or multiple configurations. If additional storage is required to meet peak demands the water heater can be connected to one or more storage tanks. If a storage tank is used an additional loading pump and thermostats are required to ensure proper control over the stored water temperature.

## Water quality

Due to the variable chemical composition of distributed water supplies it is necessary to identify the properties of the cold water feed to the water heater. In common with all types of water heating equipment, scale will develop during normal use and it is therefore essential that appropriate steps are taken to ensure reliable and continuous operation of the plant.

Contact should be made with the local water provider to determine the quality of the feed water and reference should be made to water treatment specialists for appropriate advice.

The water heater warranty requires that the conductivity of the water in the heater must be no less than 125 microsiemens/cm. This is necessary to ensure effective operation of the electrical anodic protection system.

There is no upper limit to water hardness, however where domestic feed water hardness is very high, water treatment should be considered to reduce the hardness. As hardness and conductivity are related, care should be taken not to soften the water to a point where the conductivity falls below 125 microsiemens/cm otherwise the anodic protection will be ineffective. Harder water produces more scale and results in more frequent maintenance upstream of the water heater.

## Open vented systems

For Hamworthy Dorchester DR-FC Evo open vented systems, the feed cistern and water supply from the feed system must be so sized as to ensure that the make-up water is equivalent to or exceeds the maximum draw off rate of the heater systems and any other system requirements. The hot water flow pipe from each heater must be fitted with a  $\frac{3}{4}$ " (20 mm) relief valve and an open vent  $1\frac{1}{4}$ " (32 mm) and a cold feed  $1$ " (28 mm) minimum.

No isolating valves should be fitted between the water heater and the draw off point for relief valve and open vent.

The maximum working head of the heater is 74 m (242 feet). Dead legs to water draw off points should be as short as possible and must not exceed the lengths laid down in the water supply (water fittings) regulations. These regulations state that the maximum lengths of pipe supplying a hot water draw off tap measured along the axis of the pipe from the heater, cylinder or tank from a secondary circuit are as listed below:

Pipes not greater than 19 mm I/D—maximum dead leg is 12 m.

Pipes in range 19–24 mm I/D—maximum dead leg is 7.6 m.

Pipes greater than 25 mm I/D—maximum dead leg is 3 m.

## Unvented systems

Hamworthy can offer a pre-assembled, WRAS approved unvented kit to ensure safe and compliant connection to mains cold water supplies.

The kit comes complete with water 'train', non-return valve, pressure reducing valve, strainer, expansion vessel & connection, and 6 bar expansion relief valve. This considerable simplifies site installation, allowing the water main to be connected to the supplied water train which is then connected to the heater.

Each unvented system kit is supplied with a 24 litre expansion vessel to accommodate the stored hot water expansion from the water heater. Due to the variable nature of hot water circuits an additional expansion vessel may be required to accommodate expansion from the hot water store within the distribution pipework or additional storage tanks where used. Hamworthy can supply a range of expansion vessels up to 1000 litre capacity suitable for potable hot water systems to suit most requirements.

A dedicated socket is provided on all Dorchester DR-FC Evo water heaters exclusively for the fitment of the temperature and pressure relief valve, the discharge of which should be via an air break to a tundish.

For comprehensive recommendations on the design, installation and testing of services supplying water within building, attention is drawn to the appropriate sections of BS EN 806 Parts 1 to 5 and BS 8558: 2011.

# Condensate discharge & ventilation

## Condensate discharge

When operating at suitable condensing temperatures, a condensing water heater has the potential to produce condensate at up to 13 litres per hour per 100kW input energy.

A drain connection is fitted to the boiler to enable the disposal of condensate, which is mildly acidic, with a typical value 3.5 pH, and can be disposed of normally through the drainage system. If in any doubt about local regulations, check with the local water authority.

The condensate drain on each water heater must be connected to a suitable drainage system using corrosion resistant material such as PVC plastic with glued sealed joints to prevent escape of condensate.

Drain traps and an open tundish should be incorporated into the design, and the pipework given appropriate protection from physical damage and frost.

The pipework should be installed with at least a 3 degree fall (approximately 50mm per metre).

## General ventilation requirements

An adequate supply of fresh air for combustion and ventilation must be provided in accordance with BS 5440 for installations less than 70kW, and with BS 6644 for installations greater than 70kW nett rated input.

## Boiler house temperatures

Additional requirement of BS 6644 for multiple boiler installations requires that the air supplied for boiler house ventilation shall be such that the maximum temperatures within the boiler house do not exceed:

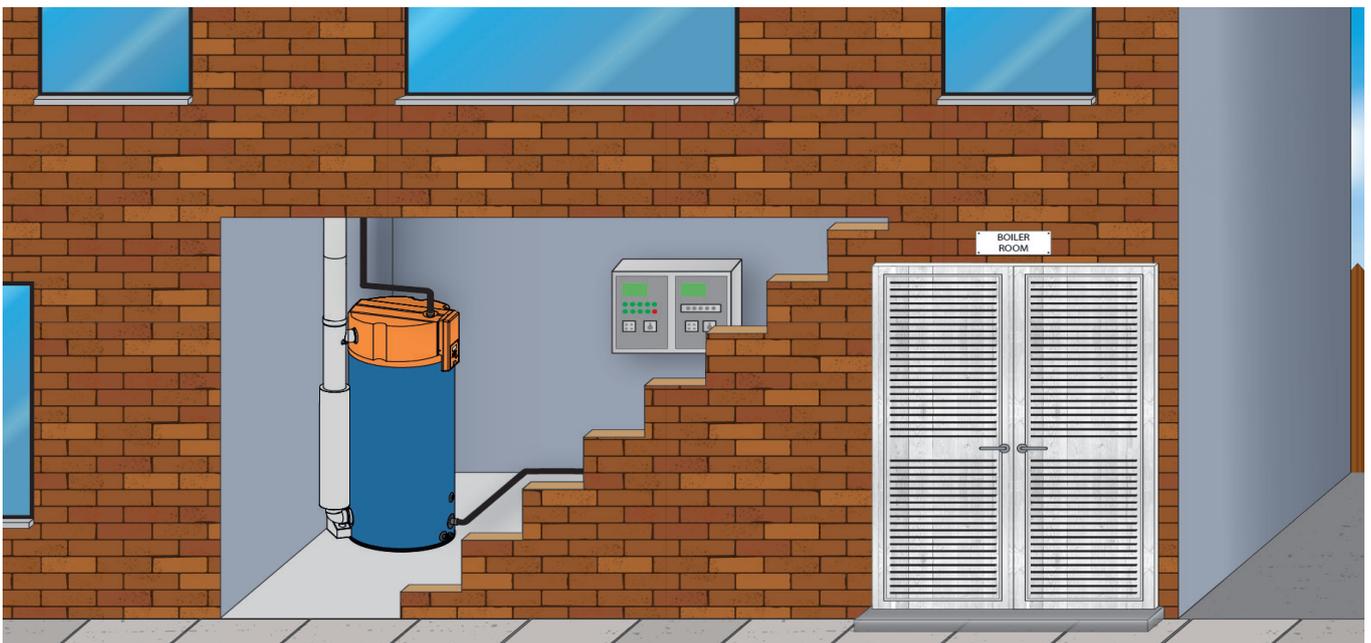
- ⦿ At floor level, 25°C (or 100mm above floor level)
- ⦿ At mid-level, 32°C (1.5m above floor level)
- ⦿ At ceiling height, 40°C (or 100mm below ceiling height)

## Ventilation grille openings

High and low level ventilation grilles shall be positioned as high and as low as practicably possible. Low level grilles will be located within 1metre of floor level for Natural Gas. High level grilles are recommended to be positioned within 15% of the boiler room height from the ceiling. High and low ventilation grilles shall communicate with the same room or internal space where compartment ventilation is used. Where ventilation grilles communicate directly with outside air they shall be positioned on the same wall.

## Air supply

The air supply should be free from contamination such as building dust and insulation fibres from lagging. To avoid unnecessary cleaning and servicing, the appliances should not be fired whilst building work is being undertaken. Where a boiler installation is to operate throughout the summer months, e.g. for domestic hot water production for more than 50% of the time, then additional ventilation allowances are required. Refer to BS 6644 for more information.



Typical plant room ventilation.

# Case study

## Drayton Manor Hotel, Staffordshire



Drayton Manor Hotel

## Products

- ⊗ Dorchester DR-FC Evo water heaters
- ⊗ Ensbury LT boilers
- ⊗ Powerstock calorifiers

## Sector

- ⊗ Hotel & Leisure

## Building

- ⊗ Hotel
- ⊗ New Build

## Application

- ⊗ Domestic Hot Water
- ⊗ Steel boilers
- ⊗ Space heating 740kW

Guests staying at Drayton Manor Theme Park's hotel are benefiting from the installation of three new Dorchester DR-FC Evo water heaters and two Ensbury LT 370 low temperature steel boilers.

The 150-bedroom hotel is the perfect getaway for families visiting the award-winning Drayton Manor Theme Park, located in Staffordshire. The hotel has 11 themed Thomas & Friends™ rooms, a restaurant, brasserie and two bars, as well as extensive, state-of-the-art conference facilities.

With a strong track record in the leisure sector, Hamworthy's products were specified for the project by The Engineering Practice, which described the gas fired condensing water heaters and high efficiency steel boilers from the leading manufacturer, as **"the perfect match for the development"**.



One of the 150 bedrooms being heated at the hotel

Kevin Edge from The Engineering Practice, who was involved with the project from the outset, said: "With the hotel able to accommodate a large number of guests at any one time, Hamworthy's Dorchester DR-FC Evo water heaters and Ensbury LT high efficiency steel boilers were judged to be the best products to effectively manage the heavy demands placed by guests on the hotel's hot water and heating system."

Martin Wright, the hotel's general manager, added: "The comfort of our guests is extremely important, so we demand high quality and reliable systems that will guarantee hot water and heating when required. Hamworthy Heating has provided such systems." Accompanied by two of Hamworthy's Powerstock 400 calorifiers, the water heaters and steel boilers are predicted to maintain low running costs and ensure the overall environmental performance of the hotel is kept consistent.

Hamworthy's Dorchester range of condensing water heaters are a practical and efficient means of producing domestic hot water for a wide range of commercial water heating applications. The range brings with it even higher outputs, significant performance improvements and seasonal efficiencies up to 107 per cent nett for commercial water heating applications.

Equipped with a modulating pre-mix burner, performance of the Dorchester DR-FC Evo is achieved with overall noise levels below 45dB(A), providing exceptionally quiet operation. Coupled with being designed to operate as open flue or room sealed, the DR-FC Evo is particularly suited to installations, such as the hotel, where the heaters with outputs of 1929 l/h need to be located close to the point of use without disturbance.



Dorchester DR-FC Evo water heaters effectively manage the constant domestic hot water demand

# Case study

## Abbey Hill Academy, Stockton-on-Tees



Abbey Hill Academy

## Products

- ⊗ Dorchester DR-FC Evo water heaters
- ⊗ Purewell VariHeat boilers

## Sector

- ⊗ Education

## Building

- ⊗ Special needs school refurbishment

## Application

- ⊗ Space heating
- ⊗ Direct fired domestic hot water

Abbey Hill Academy is a school for children with learning difficulties based in Stockton-on-Tees. The facility consists of three buildings providing a comfortable learning atmosphere for around 300 students aged 11 to 19 years.

Two old cast iron sectional non-condensing boilers were supplying heating and hot water to the main Stephenson Building consisting of 18 classrooms for around 160 students. Old atmospheric water heaters installed in the same building delivered hot water to showers, sinks, basins and the main kitchen. The Academy was looking for a cost-effective upgrade that was energy efficient, would reduce costs, could be fitted to the existing system and came with a complete package of supply to commission.

Two Dorchester DR-FC Evo direct fired condensing water heaters were chosen to replace the old water tanks, delivering a total output of 1,192 litres per hour, whilst two Purewell VariHeat cast iron condensing boiler were chosen for the heating system.

Philip McHale, Premises & Facilities Manager at Abbey Hill Academy as part of the Horizons Specialist Academy Trust said:

*"I checked a lot of boiler manufacturers and found Hamworthy's website to be useful with the offer of a free site survey. We were pleased that we got to meet both Steve Johnson, area sales manager and Stuart Turner, the national sales manager. Both had a genuine interest in our project.*

*We updated the old tank fed system that delivered poor hot water pressure to mains fed. There has been a vast improvement in hot water pressure and it has also improved our Legionella management."*

The water heaters have an anti-legionella safety function, which means water will be heated for a period at a high temperature (e.g. 65°C for one hour) to prevent the risk of legionella bacteria forming in the vessel. Additionally, the recirculation pump can be set to run to ensure the whole system is purged. Built in controls allow this task to be performed on a regular basis, ensuring water stays legionella-free and safe.

Abbey Hill Academy won a bid for the Condition Improvement Fund (CIF) which is offered by the Education Funding Agency (EFA) to fund projects to keep buildings safe and in good working order. Previous CIF rounds have been heavily oversubscribed which is why applicants need to meet the bid criteria and demonstrate the urgency of projects to secure the fund.



Two DR-FC Evo water heaters installed at Abbey Hill Academy.

# Hydraulic schemes

## Unvented cold water supply

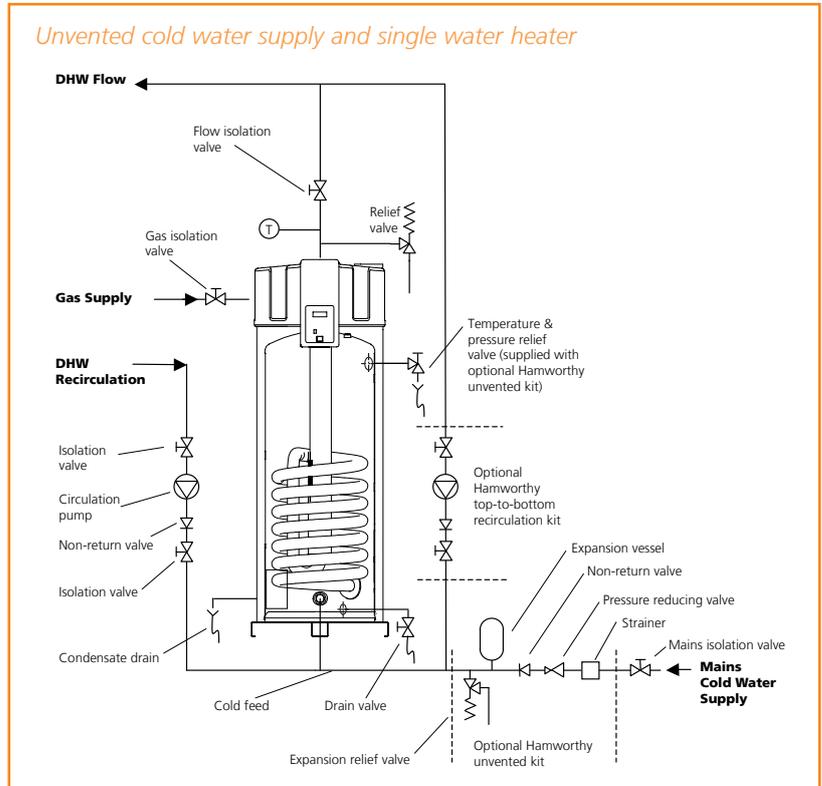
Typical pipework arrangement for a single Dorchester DR-FC Evo water heater on an unvented system.

The Water Supply (Water Fittings) regulations 1999 require a number of essential controls pre-set to specific pressure and temperature settings for unvented systems. To ensure the controls are correctly sized for the application, set to appropriate levels and assembled in the correct order, Hamworthy Heating offer the unvented kit, a single "water train" with a separate T&P (temperature and pressure) relief valve sized to suit the energy input of the water heater. The T&P relief discharge should be via an air break to a tundish.

Each unvented supply kit is designed to be used with an individual water heater. Multiple heater installations require one unvented kit per water heater.

Larger systems with additional storage may require larger capacity expansion vessel.

*Consult with Hamworthy Technical for a full range of Hamworthy expansion vessels.*



## Open vented cold water supply

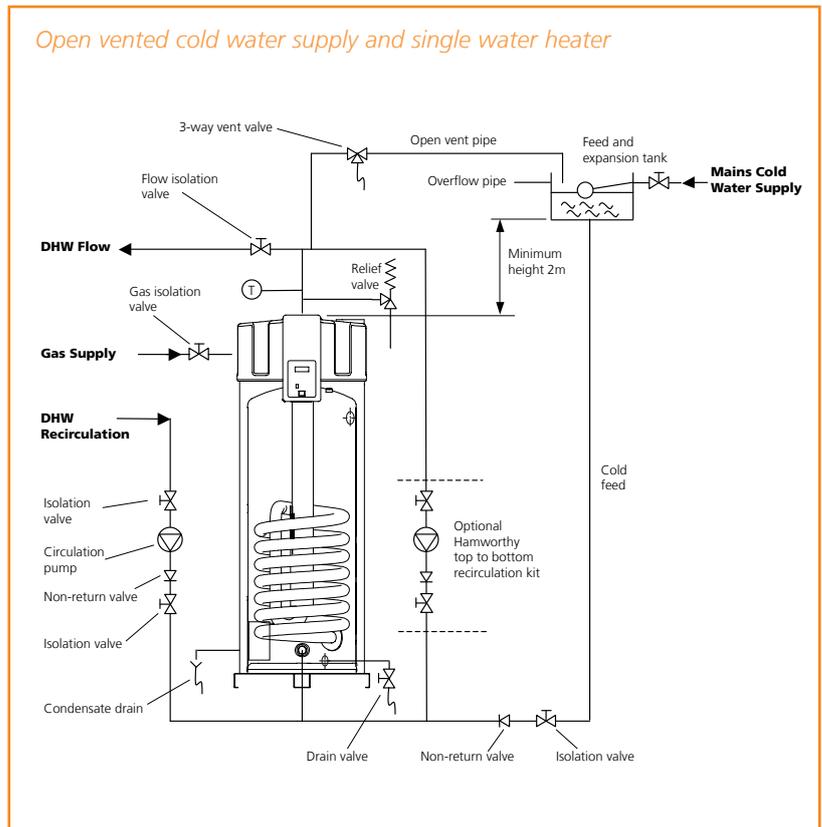
Typical pipework arrangement for a single Dorchester DR-FC Evo water heater on an open vented system.

With open vented systems the feed and expansion tank must be sized to provide sufficient cold water storage and accommodate expanded system water without the risk of overflowing.

System operating pressure is directly related to the height of the feed and expansion tank. Care must be taken therefore to locate the feed and expansion tank such that it provides sufficient head pressure so that flow can be maintained at all outlets likely to be operating concurrently.

The minimum recommended height of the bottom of the feed and expansion tank above the water heater is 2m.

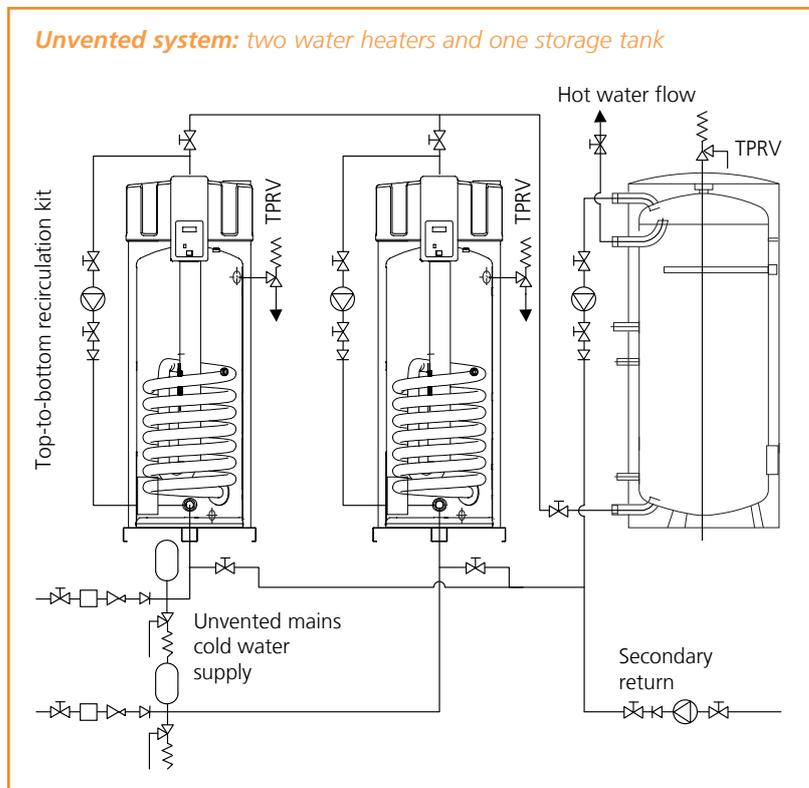
For comprehensive recommendations on the design, installation and testing of services supplying water within buildings please refer to BS 6700.



## Unvented system: two water heaters and one storage tank

Typical pipework arrangement for two Dorchester DR-FC Evo water heaters and an additional storage tank on an unvented system.

The loading pump circuit to the hot water storage tank must be run continuously throughout all anti-legionella purge periods, along with secondary circulation and top to bottom recirculation pumps to ensure the entire hot water system is fully heated to the required temperature.

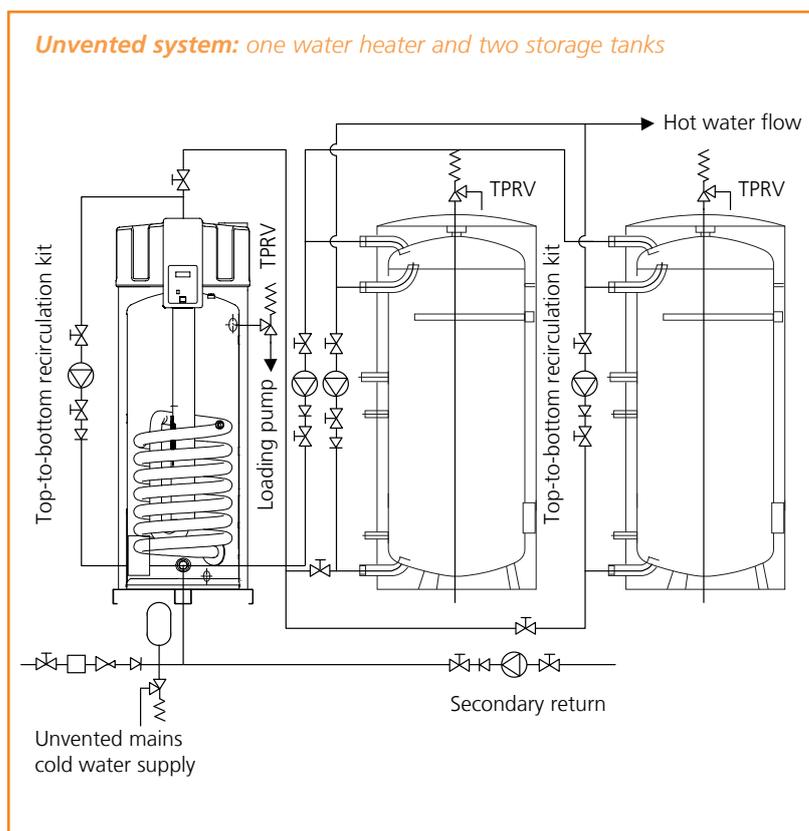


## Unvented system: one water heater and two storage tanks

Typical pipework arrangement for a single Dorchester DR-FC Evo water heater and two additional storage tanks on an unvented system.

When using additional storage tanks with unvented systems, the expansion vessel volume must be increased to accommodate the additional expansion vessels.

*Consult with Hamworthy technical for a full range of Hamworthy expansion vessels.*



# Services and warranty



## Commissioning

We strongly recommend that all water heaters are commissioned by our service department. As well as ensuring your product is set up correctly for maximum efficiencies you will receive extra benefits on warranty (see below). On completion, you will get a report with details of the initial operating settings.

## Service

Installed water heaters will experience a wide variation in operating conditions that can occur due to differing patterns of usage and the variable chemical nature of distributed water supplies. It is therefore strongly recommended that water heaters be drained and inspected within 3 months of the initial commissioning. Once the levels of calcium deposition are established a suitable maintenance schedule can be implemented, however as a minimum all water heaters should be serviced annually. To maintain your water heaters, we have a range of servicing options that can be tailored to your requirements. For more information on commissioning and service please contact Hamworthy Heating Service Department.



## Warranty

The Dorchester DR-FC Evo comes with a 2-year warranty (except for consumables in line with our Terms and Conditions). Where the product is commissioned by Hamworthy service engineers within 6 months of delivery date, then the two-year warranty covers parts and labour from date of commissioning. We offer tailored packages to suit individual customer requirements, many of which include extended warranty benefits. Full details of warranty terms and conditions are available on request.



## Spares

Essential to any maintenance and service regime is the availability of quality spare parts.

By coming to us, you can be assured of genuine spare parts and may also benefit from technological improvements. We have a long-term commitment to spare parts for our products.

## Delivery

Dorchester water heaters are delivered factory assembled and mounted within frames, shrink-wrapped and on a steel pallet base which is fitted permanently to the unit. Dorchester water heaters are available as a special order without the pallet base, please contact Hamworthy for more information.

Standard delivery for all Hamworthy products is free of charge.

Deliveries are closely co-ordinated with the customer, to suit the site construction programme. Products are delivered to ground level and it is the responsibility of the customer to arrange movement of products from here to the required location on site.

To enquire about special delivery services including FORS and time critical deliveries (additional charges apply) please contact our customer services team.

## Service

Tel: **01202 662555**

Email: **service@hamworthy-heating.com**

## Spares

Tel: **01202 662525** Fax: **01202 662551**

Email: **spares@hamworthy-heating.com**

# Complete your system

As well as energy efficient water heaters, we supply commercial boilers and hot water storage tanks to help complete your system.

## System equipment

### Powerstock storage tanks

Powerstock hot water storage tanks are the perfect partner for Dorchester water heaters where large volumes of hot water are required with intermittent use.

Available in 300, 500, 750 and 1000 litre capacities, these high quality glass lined storage tanks can be installed in single or multiple configurations to match the hot water demand and increase system security.

Powerstock storage tanks are WRAS approved and suitable for both unvented and open vented applications.



Burstock expansion vessel



Powerstock calorifier



Trigon solar thermal system

### Trigon solar thermal system

A complete solar hot water system including solar collectors, transfer stations, and controller.

### Burstock expansion vessel

Floor standing expansions vessels for use with sealed heating and hot water systems. Available in 10 models from 25 to 1000 litres.

## Boilers

### Floor standing condensing boilers

We have an extensive range of floor standing modular boilers with outputs from 70kW up to 1050kW. With natural gas and LPG options available they can be used across the UK.

The Upton and Wessex ModuMax mk3 boilers are designed as vertically stacking modular boilers to fit in the smallest of plant rooms – offering over 1MW output from 1 metre squared footprint.

Purewell VariHeat boilers are built around a cast iron heat exchanger for tolerance to older heating circuits, making them a perfect choice for refurbishment and replacing old atmospheric boilers.

For larger heat loads or simplified design, the Varmax boilers do not need to be installed with a primary circuit and have split temperature return connections for improved efficiency.



Upton



Purewell VariHeat mk2



Stratton mk2



Wessex ModuMax mk3



Ensbury LT

### Wall hung condensing boilers

The Stratton mk2 wall hung boiler offers the benefits of a long life and corrosion resistance with a stainless steel heat exchanger. It can also fit into low height plant rooms thanks to a built in flue gas non return valve and low height pipework kits.

### Pressure jet boilers

For higher heating demands and a greater choice of fuel options including oil and biofuel, Hamworthy can provide pressure jet/power flame boilers. With outputs from 75kW right up to 10MW, and a choice of matched burners.

# About Hamworthy

Hamworthy Heating is a leading British commercial boiler manufacturer. Our energy efficient heating, hot water and renewable solutions are used in buildings across the UK.

## The Hamworthy difference

### British engineering excellence

Here in the UK, we design, test, manufacture and source market-leading products. We know our products inside out, back to front and from start to finish. You can trust that we know what we're talking about.

### Lifetime support

From design and specification, through to commissioning, training and maintenance, as well as commitment to spares availability. We provide long term support for businesses with their commercial heating and hot water needs.

### People first

It's not just our products that set us apart, it's our people. Truly excellent customer service, great technical knowledge and being easy to deal with.

That's the Hamworthy difference.



## Everyone's got history, we've got heritage

Our roots date back to 1914 when two brothers in Poole set up Hamworthy Engineering. Decades of experience go in to every nut, screw and bolt. Every phone call, text and email. Since 2008, we've been part of Groupe Atlantic, a company with a similar ethos to us. Groupe Atlantic was founded in 1968 by two engineers and is now one of the market leaders in the European heating and hot water industry. We're now part of their growing UK, ROI and North America Divisions.



### Our associations

We are an active member of trade associations and professional bodies supporting the industries we work in.

### Our accreditations

International Organisation for Standardisation (ISO) is the world's largest developer of voluntary International Standards. We are proud to have been awarded the following ISO accreditations:

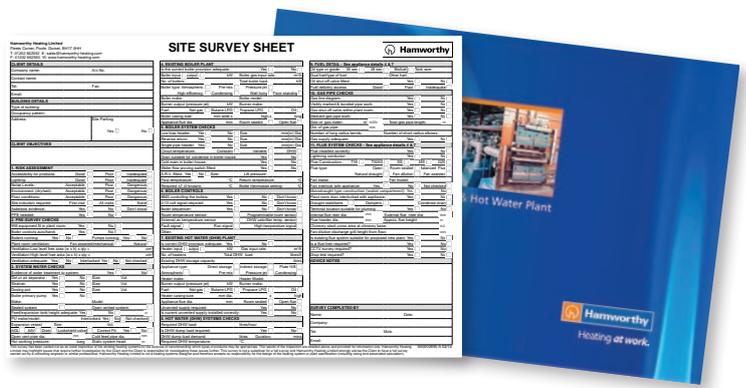
- ISO 9001 Quality Management System
- ISO 14001 Environmental Management System
- ISO 45001 Health and Safety Management System

When you deal with Hamworthy, have confidence that we're working within a defined set of standards that is internationally recognised.



## Book a free site survey

[hamworthy-heating.com/site-survey](http://hamworthy-heating.com/site-survey)

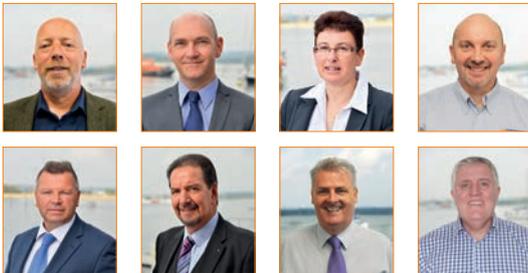


## View our full CPD and product training offer

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[hamworthy-heating.com/training](http://hamworthy-heating.com/training)

## Download product literature and drawings

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## Find out who your local contact is

[hamworthy-heating.com/find-your-local-sales-manager](http://hamworthy-heating.com/find-your-local-sales-manager)

## Get information for discontinued products

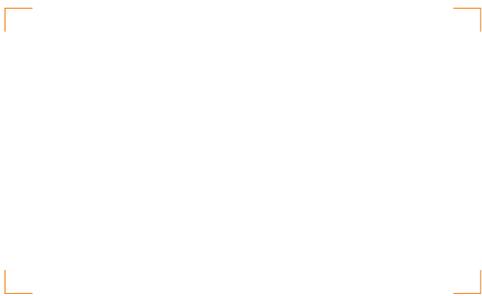
[hamworthy-heating.com/discontinued-products](http://hamworthy-heating.com/discontinued-products)



## Contact our in-house technical support team on

**01202 662505**

Your local contact is:



**British engineering excellence from Hamworthy Heating;  
the commercial heating and hot water specialists.**



**Hamworthy**



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MANUFACTURING**

**Hamworthy Heating Accreditations**

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ISO 14001 Environmental Management System  
ISO 45001 Health & Safety Management System



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Hamworthy Heating reserves the right to make changes and improvements  
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