Hamworthy

Heating *at work.*

Dorchester DR-CC

Condensing direct fired water heater •
Simple to use integrated controls •
Modulating burner •

SMALL
FLEXIBLE
and ErP 2018 Compliant

9 MODELS,
CONTINUOUS OUTPUTS 228 - 614L/H

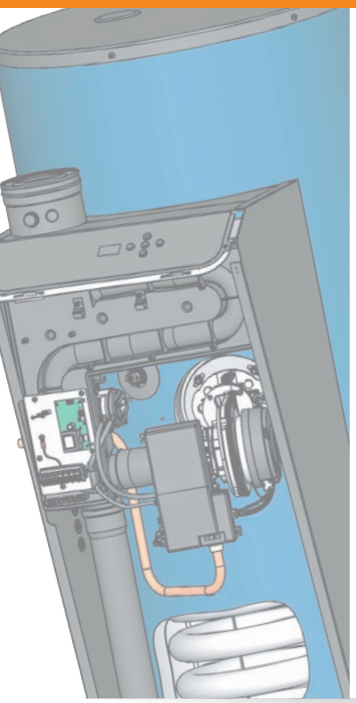
up to 98% Gross Seasonal Efficiency | Nat Gas LPG | 2 Yr Warranty | ErP Part L Compliant

CONTENTS

Compact **condensing**

The Dorchester DR-CC water heater is a compact, condensing unit with integrated simple to use controls.

Its size and flexible flue options make it suited to small to medium sized commercial applications.



Small, flexible and ErP compliant

The Dorchester DR-CC range of condensing water heaters is designed to meet the needs of new build and refurbishment projects.

Choose from 9 models with low gas inputs starting at 12.1kW, continuous outputs (@44°C ΔT) from 228l/h to 614l/h and storage capacities from 162 to 384 litres.

Direct fired water heater units ensure a fast heat up and response time. They can be installed close to the point of use, reducing the energy required to supply the water over a long pipe run and minimising distribution heat losses.

Excellent efficiency of up to 109% net provides an economic solution with less energy wastage than traditional atmospheric water heaters.

Low NOx emissions under 37 mg/kWh make the Dorchester DR-CC an environmentally friendly solution, particularly for new building projects applying for BREEAM rating.

With load profiles of XL or XXL and an A rating, all models in the range are fully compliant with the ErP (Energy-related Products Directive) regulations coming in September 2018.

Key benefits

- Fits through a standard doorway
- Low NOx
- Heat exchanger design and burner location distributes heat evenly
- Easy access for service and maintenance
- Flexible flue options
- Minimal clearances

Key features:

- Condensing, direct fired gas water heater
- 9 models 4 different kW outputs: 11, 18, 22 & 29kW
- Continuous outputs: 228, 233, 374, 461, 465, 602, 608 & 614l/h
- 5 storage capacity options: 162, 202, 247, 288 & 384 litres
- Natural gas and LPG
- Up to 98% Gross Seasonal Efficiency
- Common components across the range

Optional kit (Page 6)

- Unvented supply kit

Controls (Page 10)

- Temperature control and protection
- Hysteresis control
- External on/off connection
- Volt free alarm signal for BMS
- Status and error code display

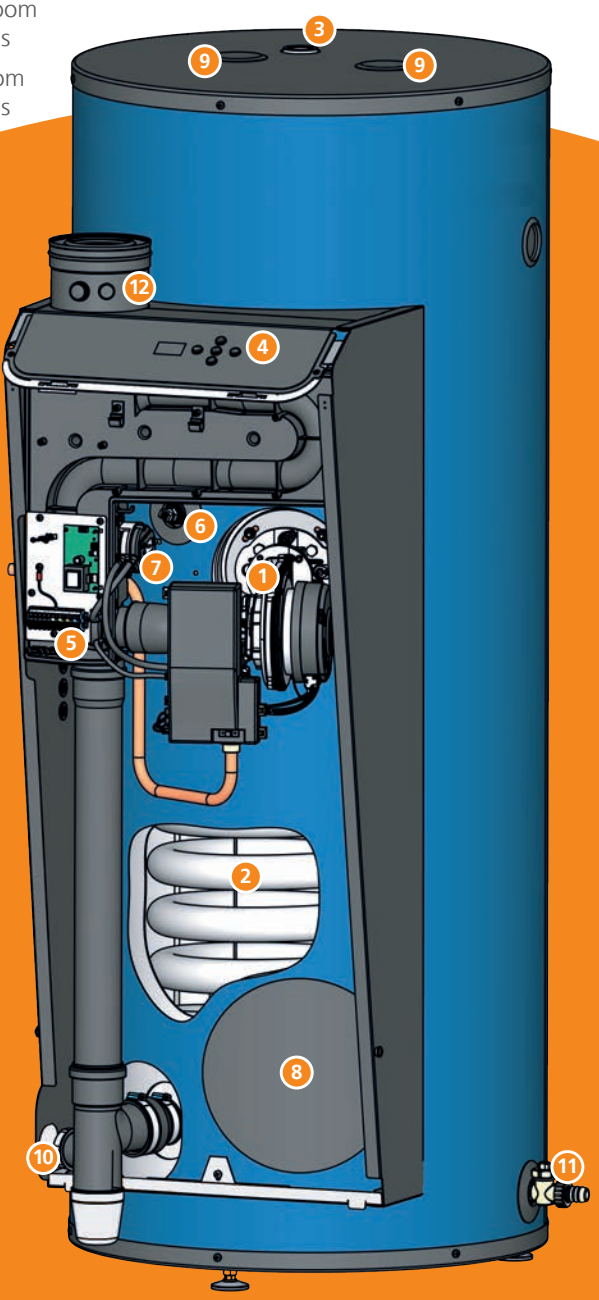
Flues (Page 12-15)

- Horizontal or vertical flue terminal kit
- B23 open flue systems
- C13 concentric room sealed flue systems
- C33 concentric room sealed flue systems
- C43 Concentric room sealed flue systems
- C53 twin duct room sealed flue systems

Service & Warranty (Page 20)

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

Anatomy of the Dorchester DR-CC



1. Pre-mix gas burner
2. Heat exchanger
3. Hot water outlet
4. Control panel
5. Electrical connector block
6. Temperature sensor
7. Air pressure switch
8. Clean out door
9. Electrical anodes
10. Condense connection
11. Drain valve
12. Concentric flue connection

CONTINUOUS OUTPUTS

9 MODELS

228-614 LITRES/HOUR

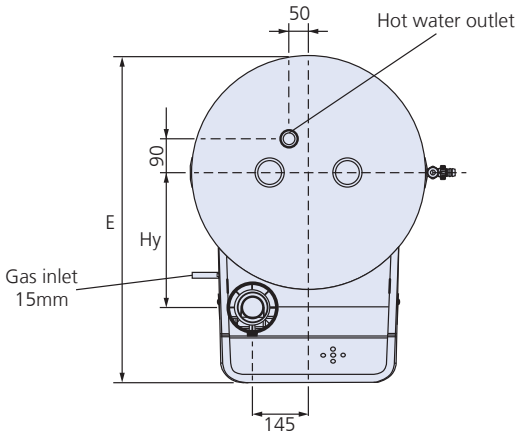
Technical data & dimensions

All Models

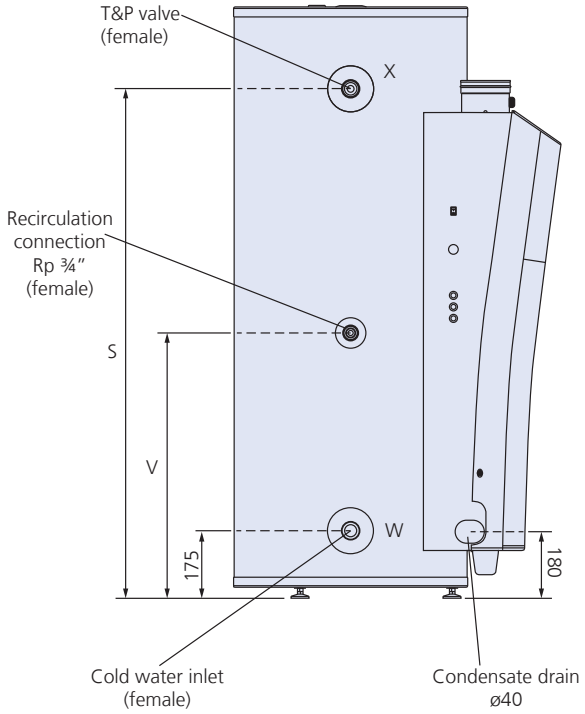
	Dorchester DR-CC model	Units	DR-CC 12-160	DR-CC 12-200	DR-CC 20-160	DR-CC 20-200	DR-CC 24-245	DR-CC 24-285	DR-CC 32-245	DR-CC 32-285	DR-CC 32-380
Water	Continuous output with 44°C ΔT	l/h	228	233	374	374	461	465	602	608	614
	1st hour output with 44°C ΔT	l	360	470	510	620	740	820	870	960	1100
	Continuous output with 50°C ΔT	l/h	201	205	329	329	406	410	530	535	540
	1st hour output with 50°C ΔT	l	310	410	440	540	640	720	760	840	950
	Continuous output with 56°C ΔT	l/h	180	183	294	294	362	366	473	478	482
	1st hour output with 56°C ΔT	l	270	360	380	480	560	630	670	740	840
	Storage capacity	litres	162	202	162	202	247	288	247	288	384
	Maximum working pressure	bar	8	8	8	8	8	8	8	8	8
	ErP load profile	-	XL	XL	XL	XL	XXL	XXL	XXL	XXL	XXL
Energy	Building Regulations thermal efficiency gross	%	96	98	95	95	96	97	95	96	97
	ErP efficiency rating	-	A	A	A	A	A	A	A	A	A
	Heating-up time, ΔT = 44°C	min.	27	41	17	27	25	31	20	24	31
	Heating-up time, ΔT = 50°C	min.	31	47	19	30	29	35	22	27	36
	Heating-up time, ΔT = 56°C	min.	34	52	22	34	32	40	25	31	40
	Standby losses	kW/24h	2.16	2.3	2.16	2.3	2.64	2.97	2.64	2.97	2.9
Nat Gas	Input, gross – maximum	kW	12.1	12.1	20	20	24.4	24.4	32.2	32.2	32.2
	Input, net - maximum	kW	10.9	10.9	18	18	22	22	29	29	29
	Output – maximum	kW	11.7	11.9	19.1	19.1	23.5	23.8	30.7	31	31.3
	Gas inlet pressure – nominal	mbar	20	20	20	20	20	20	20	20	20
	Gas flow rate – maximum @1013.25 mbar and 15°C	m^3/h	1.2	1.2	1.9	1.9	2.3	2.3	3.1	3.1	3.1
LPG	Input, gross – maximum	kW	11.8	11.8	19.6	19.6	23.9	23.9	31.5	31.5	31.5
	Output – maximum	kW	11.4	11.6	18.7	18.7	23	23.3	30.1	30.4	30.7
	Gas inlet pressure – nominal	mbar	37	37	37	37	37	37	37	37	37
	Gas flow rate – maximum@1013.25 mbar and 15°C	kg/h	0.8	0.8	1.4	1.4	1.7	1.7	2.3	2.3	2.3
Flue	Approximate flue gas volume @15°C, 9.8% CO_2, N.T.P. (Nat. Gas - G20)	m^3/h	14.72	14.72	24.34	24.34	29.76	29.76	39.3	39.3	39.3
	Flue gas temperature – maximum	°C	42	61	42	61	57	65	57	65	65
	NOx emission, dry air free, European Class 6. Maximum (at part load)	mg/kWh	22	22	30	30	33	33	37	37	37
	Pressure at the flue outlet only (B23) with zero pressure at air inlet	Pa	33	33	59	59	108	108	192	192	192
Electrical	Start current–maximum (maximum power)	A (W)	25	25	36	36	51	51	85	85	85
	Run current–maximum (maximum power)	A (W)	85	85	85	85	105	105	105	105	105
	Electrical supply	Vac	230V 50Hz	230V 50Hz	230V 50Hz	230V 50Hz	230V 50Hz	230V 50Hz	230V 50Hz	230V 50Hz	230V 50Hz
	Voltage tolerance	% of Vac	-15% +10%	-15% +10%	-15% +10%	-15% +10%	-15% +10%	-15% +10%	-15% +10%	-15% +10%	-15% +10%
Misc.	Noise level	dB(A)	41	41	52	52	53	53	58	58	58
	Number of anodes	-	1	1	1	1	2	2	2	2	2
	Weight when empty	kg	95	106	95	106	120	136	120	136	155
	Approximate shipping weight	kg	114	122	114	122	136	153	136	153	172
	Maximum floor load/ weight filled with water	kg	255	306	255	306	365	429	365	429	551

Clearances

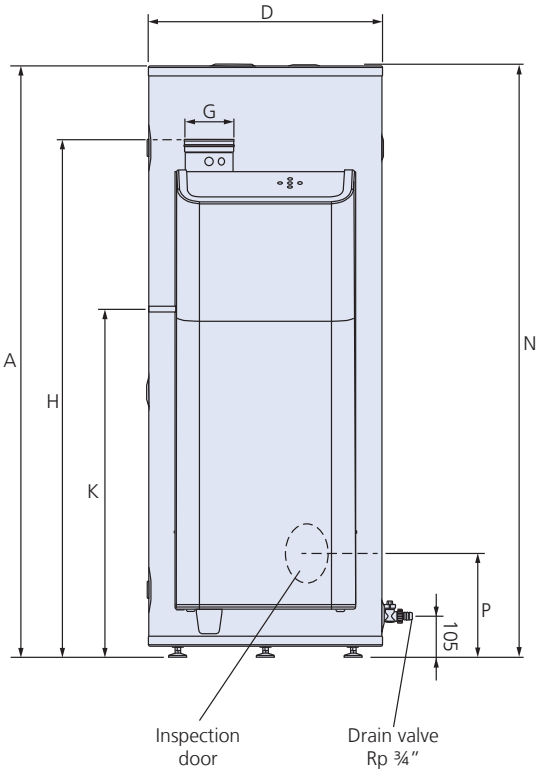
- 1000mm at front
- 500mm at sides
- 1000mm at top
- No rear clearances



Plan



Side



Front

Ref.	Dimension	DR-CC 12-160	DR-CC 12-200	DR-CC 20-160	DR-CC 20-200	DR-CC 24-245	DR-CC 24-285	DR-CC 32-245	DR-CC 32-285	DR-CC 32-380
A	Total height	1270	1545	1270	1545	1545	1745	1545	1745	1745
D	Width	560	560	560	560	610	610	610	610	675
E	Depth	805	805	805	805	855	855	855	855	920
G	Flue connection	80/125	80/125	80/125	80/125	80/125	80/125	80/125	80/125	80/125
H	Height of flue outlet	1310	1310	1310	1310	1350	1350	1350	1350	1350
Hy	Position flue outlet	325	325	325	325	350	350	350	350	385
K	Height of gas connection	870	870	870	870	910	910	910	910	910
N	Height of hot water outlet	1270	1545	1270	1545	1545	1745	1545	1745	1745
P	Height of Inspection door	155	155	155	155	280	280	280	280	280
S	Height of T&P - valve connection	1070	1325	1070	1325	1330	1535	1330	1535	1520
V	Height recirculation connection	605	605	605	605	690	690	690	690	690
W	Cold water inlet	Rp 3/4	Rp 3/4	Rp 3/4	Rp 3/4	Rp 1	Rp 1	Rp 1	Rp 1	Rp 1
X	T&P-valve connection (female)	Rp 3/4	Rp 3/4	Rp 3/4	Rp 3/4	Rp 1	Rp 1	Rp 1	Rp 1	Rp 1

Note: All dimensions in mm unless otherwise stated.

Unvented kits

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.

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

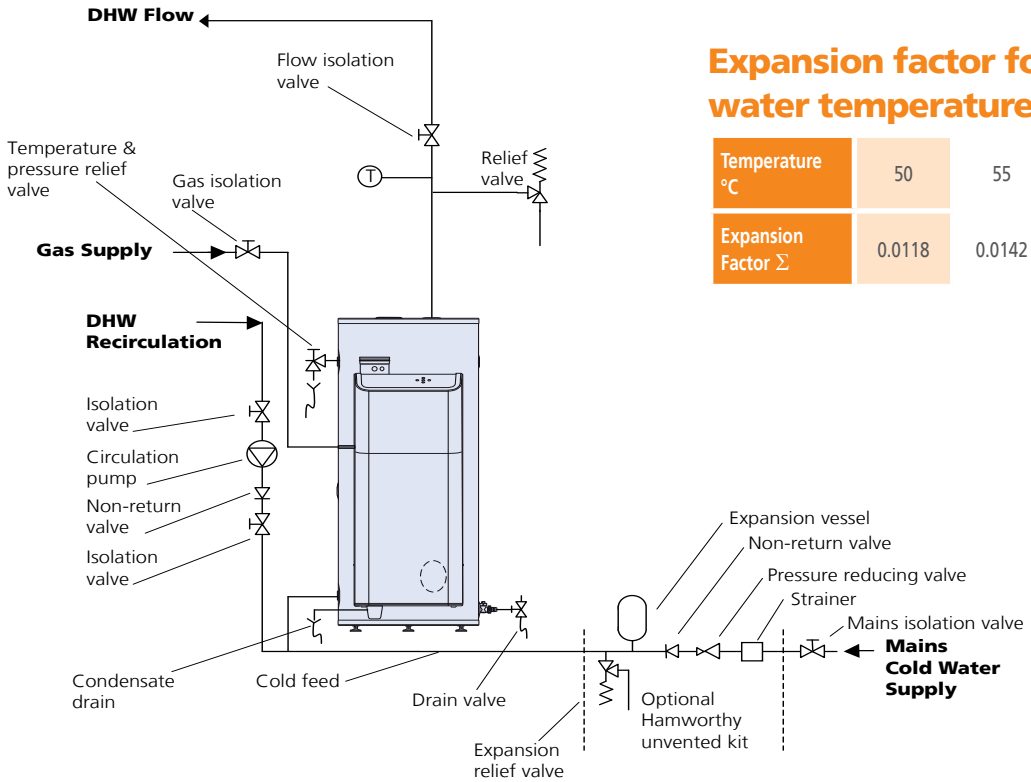
- Strainer
- Non adjustable pressure reducing valve factory set at 3.5bar
- Non return valve
- ¾" Expansion relief valve, 6 bar
- Temperature and pressure relief valve, 7 bar, 95°C
- 24 litre expansion vessel, 3.5 bar cushion pressure.

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 (WRAS), including a suitably sized pressure and temperature relief valve, which locates directly into the water heater.



Expansion vessel sizing calculation

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

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

Where V_2 = Required expansion vessel
V_1 = Total system volume (cylinder plus pipework)
Σ = 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:

Volume (litres) per metre = $0.0031428 \times r^2$
Where r = Internal radius = ((½ x Outside Diameter) - wall thickness), in mm and L = length of pipe, in metres

Example
For a 10 m length of EN 1057 copper pipe, 22mm outside diameter, with wall thickness 0.9 mm, the internal radius r = ((22/2) - 0.9) = 10.1 mm.
Volume of water per metre = $0.0031428 \times r^2$
= $0.0031428 \times 10.1 \times 10.1$
= 0.3206 litres/metre
Therefore total volume of water in 10 m of pipe is 10 x 0.3206 = 3.206 litres.

Expansion factor for different water temperatures

Temperature °C	50	55	60	65	70
Expansion Factor Σ	0.0118	0.0142	0.0168	0.0196	0.0225

Electrical connections

The electrical connection junction box is located within the middle 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

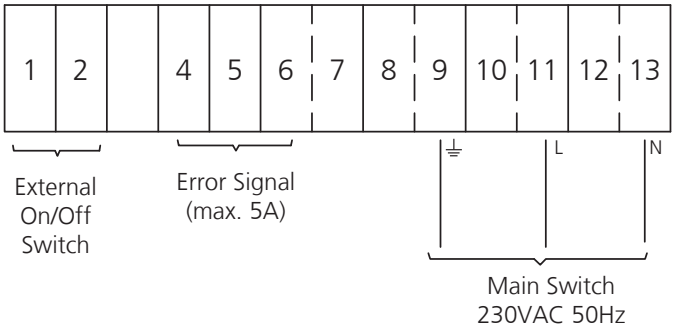
An independent isolator and fused electrical supply is required for each water heater and remote monitoring unit for interfacing with a building management system (BMS). Supply 230 volt, 50 Hz, single phase.

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 1.00 mm2. External fuses should be 6 Amp.

Remote alarm/fault signal

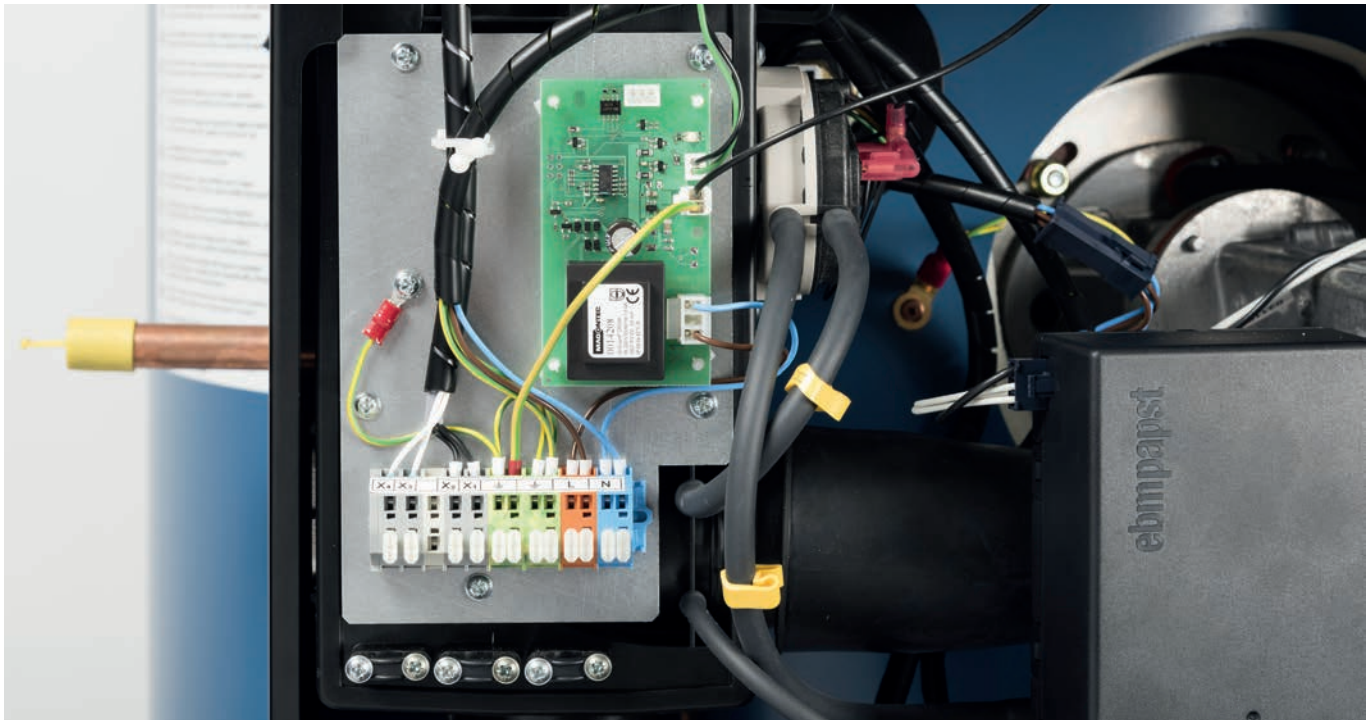
In the event of the water heater developing a fault, a common alarm signal is raised, which closes a normally-open volt-free switch to connect terminals 4 and 5 together. This can be used to complete a circuit switching on an externally powered (maximum 230 V) fault indication lamp or alarm circuit (not 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.

Electrical connections diagram



The following electrical connections are provided on each water heater:

- Supply live, neutral and earth
- Alarm signal output (volt free contact)
- Remote enable of water heater



Specification

Construction

The Dorchester DR-CC is manufactured from enamelled steel, with the vessel being fully insulated to minimise standing losses. 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 840ºC 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 50 mm layer of CFC free foam insulation to ensure that standing losses are kept to a minimum.

Burner (1)

The modulating pre-mix burner is mounted on the side of the heater reducing the clearances required above the unit. 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 5.8kW.

Heat exchanger

The DR-CC incorporates a 'cold zone' heat exchanger design with the coil located in the middle of the unit. The design gives a greater surface area for more transfer of heat as well as even heat distribution inside the tank. This reduces the likelihood of stratification within the unit and in some cases, may negate the need for a dedicated re-circulation kit.

Condensing effect (2)

In the heat exchange 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.

Clean out door (3)

The Dorchester DR-CC has 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.

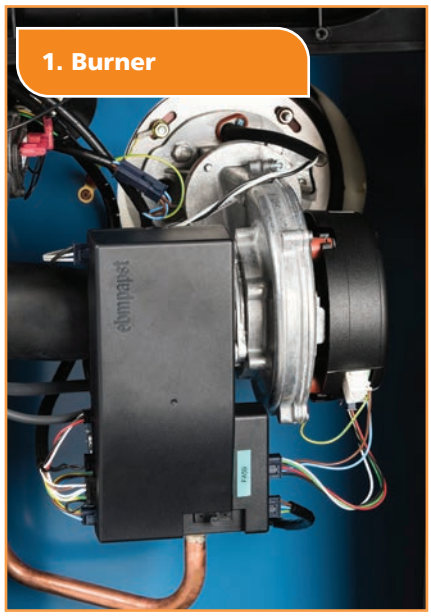
Electrical anode protection (4)

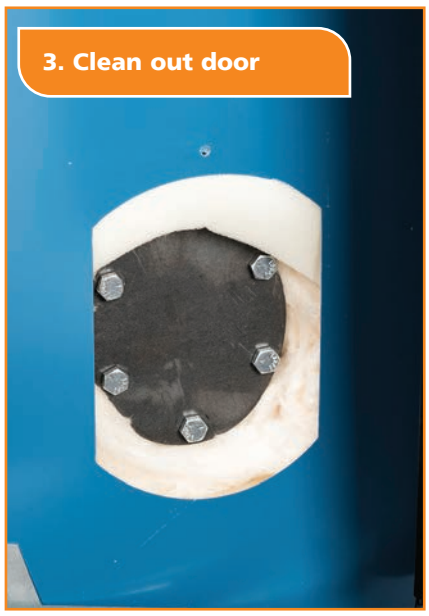
All models are fitted with electrical anodic corrosion protection as standard, ensuring excellent protection from corrosion, and being fully effective even with water supplies that have conductivity as low as 125 micro-siemens. Non-sacrificial anodes are used and these require no routine maintenance 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 uninterruptable power supply is recommended to ensure proper protection of the unit is maintained.

Low NOx

With NOX emissions of 37mg/kWh or less across the range, the Dorchester DR-CC achieves maximum BREEAM points and is compliant with the 2018 ErP regulations for water heaters.





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-CC must not be installed in basement plant rooms.

Flue connection (5)

The flues gases exit the cylinder at the base of the unit and return to the top of the water heater. An adaptor to combine the incoming combustion air and discharging flue gases into a concentric connection is located within the middle section of the casing. An air inlet screen removes dirt particles and bugs to ensure clean combustion.

Flue system

Dorchester DR-CC water heaters are suitable for B23 open flue or C13, C33, C43 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 75m. Shorter runs can use concentric ducts up to 40m.

Safety

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.

Flexible installation

With a range of flue components and optional unvented kits for direct connection to mains supply, the Dorchester DR-CC can be installed in a variety of situations. All models fit through a standard doorway and with minimal clearances required to the top, front and sides, and none to the rear, the DR-CC ensures easy access and positioning in plantrooms.

Open vented or unvented systems (6)

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.

4. Anode protection

5. Flue connection

6. Unvented kit

Controls

The Dorchester DR-CC range features integrated controls operated through a digital control panel and backlit display. Settings can be programmed via the easy to use control panel.

When in the 'on' mode and heating the water, the display will switch between showing the actual temperature and the set point temperature. When not heating, the display will only show the actual temperature. When the water heater is switched off it will display 'off', unless the frost protection is activated where it will show the actual water temperature.

It can also display error conditions, service conditions, and anode warnings.

Controller features include:

- Hysteresis control
- Continuous ON or OFF modes
- Frost protection function

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.

- Operating temperature set point range 40°C to 85°C
- Intermediate limit temperature set point 90°C with auto reset
- High limit temperature set point 97°C, requires manual reset
- Frost protection temperature set point, 5°C.

Hysteresis control

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

ON/OFF operation

Each water heater operates in an ON or OFF condition with the heater in a 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-CC water heaters are supplied as standard with a frost protection sensor. 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.

Data logging and error history

Water heater data such as burning hours, no. of ignitions, flame errors, and errors history are stored in the controller memory and can be viewed on the water heater controller.

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-CC 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 30 minutes) to prevent the risk of legionella bacteria forming in the vessel.

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"Very good session with lots of very detailed and relevant information. Would highly recommend!"

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- **Best Practice Heating & Hot Water Plant Refurbishment**
- **Energy Saving in Commercial Heating and Hot Water - Could you save a £million?**
- **Best Practice in Domestic Hot Water (DHW) - 3 modules**

Product Training

Get hands-on training with Hamworthy's commercial boilers.

We can provide training onsite, online, or you can attend a course at one of our training centres. Delivered by Groupe Atlantic engineers with years of product knowledge and industry experience. By attending our training you'll be more confident in running our equipment.

The course will guide you through the servicing and fault finding of Hamworthy products to ensure they are operating at their maximum efficiencies.

Hamworthy's training centres are conveniently located across the UK.

Each training centre has live firing boilers as well as a display of boilers, water heaters and additional system equipment.

See the latest training dates and book your place online:
hamworthy-heating.com/training

Training courses available:

- **Purewell Variheat mk2 boiler**
- **Stratton mk2 wall hung boiler**
- **Wessex ModuMax mk3 boiler**
- **Upton boiler**

Flues

The Dorchester DR-CC 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.

Flue system construction

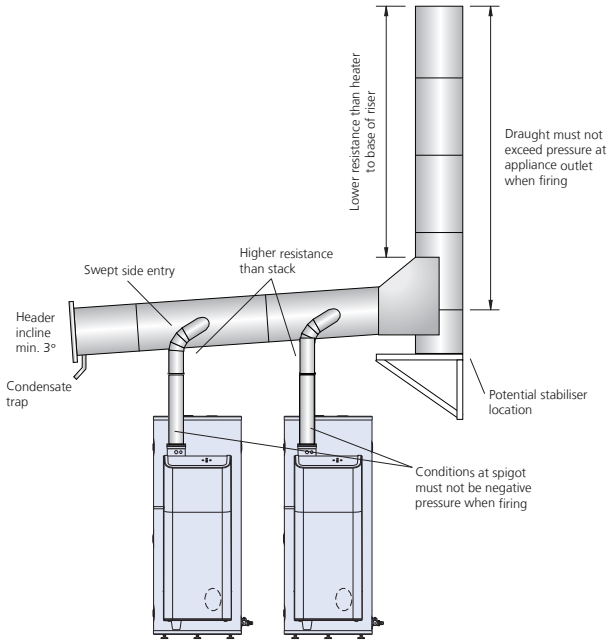
The flue system must be capable of handling saturated flue gases. Flue construction should be fully welded and CE marked for positive pressure application. All Hamworthy flue components have been matched and tested specifically for use with these water heaters. This ensures optimum performance from the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

Flue components are constructed from polypropylene for concentric, twin duct and open flue arrangements. 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-CC 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 15 for more details.

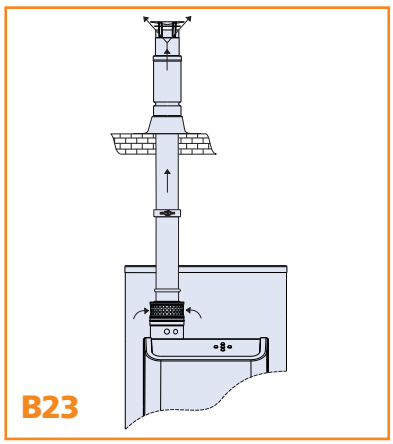


Maximum flue gas pressure for B23, C13, C33 and C53 type flue systems

Model	Maximum flue gas pressure			
	Outlet only (B23)		Inlet + outlet (C13, C33 and C53)	
	Pinlet /mBar	Poutlet/mBar	Pinlet /mBar	Poutlet/mBar
DR-CC 12-160	0	0.33	-0.25	0.23
DR-CC 12-200	0	0.33	-0.25	0.23
DR-CC 20-160	0	0.59	-0.44	0.41
DR-CC 20-200	0	0.59	-0.44	0.41
DR-CC 24-245	0	1.08	-0.56	0.56
DR-CC 24-285	0	1.08	-0.56	0.56
DR-CC 32-245	0	1.92	-1.00	1.00
DR-CC 32-258	0	1.92	-1.00	1.00
DR-CC 32-380	0	1.92	-1.00	1.00

Type B23 open flue systems

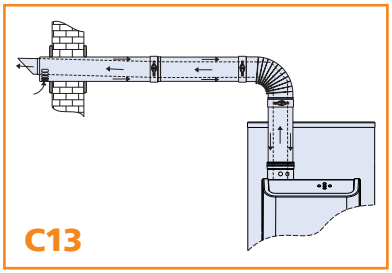
Dorchester DR-CC open flues are arranged for air supply directly from the plant room with vertical flue discharge. Ducting between the heater and the flue terminal is made using single tubes.

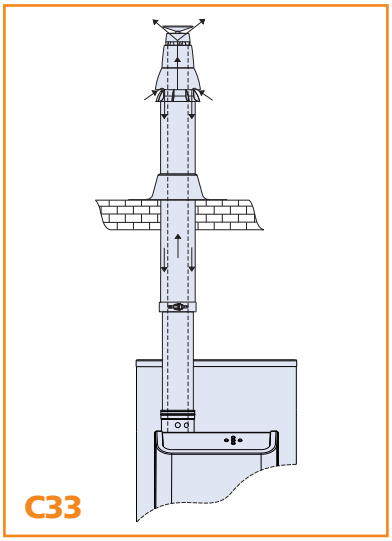


Model	Diameter (mm)	Maximum length (m)	Elbow equiv. length (m)	
			90°	45°
DR-CC 12-160	80	50	3.9	1.1
DR-CC 20-160	80	50	3.9	1.1
DR-CC 12-200	80	50	3.9	1.1
DR-CC 20-200	80	50	3.9	1.1
DR-CC 24-245	80	75	3.9	1.1
DR-CC 32-245	80	75	3.9	1.1
DR-CC 24-285	80	75	3.9	1.1
DR-CC 32-285	80	75	3.9	1.1
DR-CC 32-380	80	75	3.9	1.1

Type C13 concentric flue systems

The Dorchester DR-CC can be flued with either horizontal or vertical discharge through concentric terminals. Ducting from heater to terminal can be made using concentric tubes.



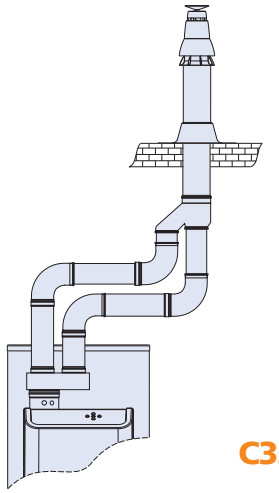


Model	Diameter (mm)	Maximum length (m)	Elbow equiv. length (m)
			45° /90°
DR-CC 12-160	80/125	40	8
DR-CC 20-160	80/125	40	8
DR-CC 12-200	80/125	40	8
DR-CC 20-200	80/125	40	8
DR-CC 24-245	80/125	40	8
DR-CC 32-245	80/125	40	8
DR-CC 24-285	80/125	40	8
DR-CC 32-285	80/125	40	8
DR-CC 32-380	80/125	40	8

Type C13, C33, C43 and C53 parallel flue systems

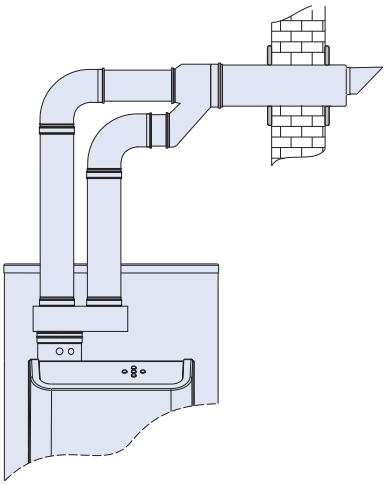
Dorchester DR-CC room sealed flues can be arranged for horizontal air supply and vertical flue discharge.
Ducting between the heater and the air/flue terminals is made using single tubes.

C13, C33 and C43 flue systems use a concentric terminal while C53 use twin ducts

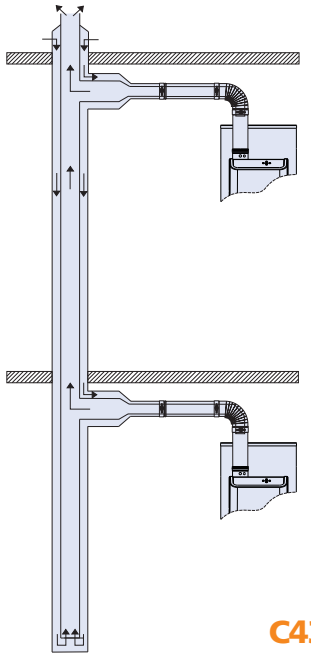


C33

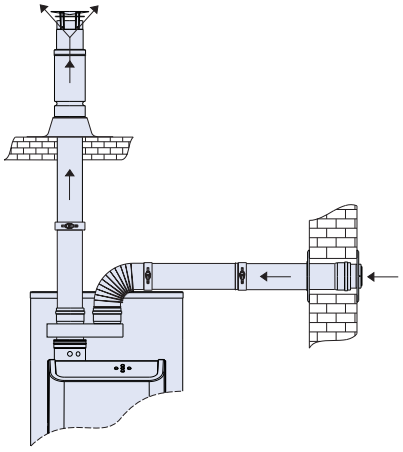
Model	Diameter (mm)	Maximum length (m)	Equivalent lengths (m)	
			90°	45°
DR-CC 12-160	80	50	3.9	1.1
DR-CC 20-160	80	50	3.9	1.1
DR-CC 12-200	80	50	3.9	1.1
DR-CC 20-200	80	50	3.9	1.1
DR-CC 24-245	80	75	3.9	1.1
DR-CC 32-245	80	75	3.9	1.1
DR-CC 24-285	80	75	3.9	1.1
DR-CC 32-285	80	75	3.9	1.1
DR-CC 32-380	80	75	3.9	1.1



C13



C43



C53

Flues design for combined systems

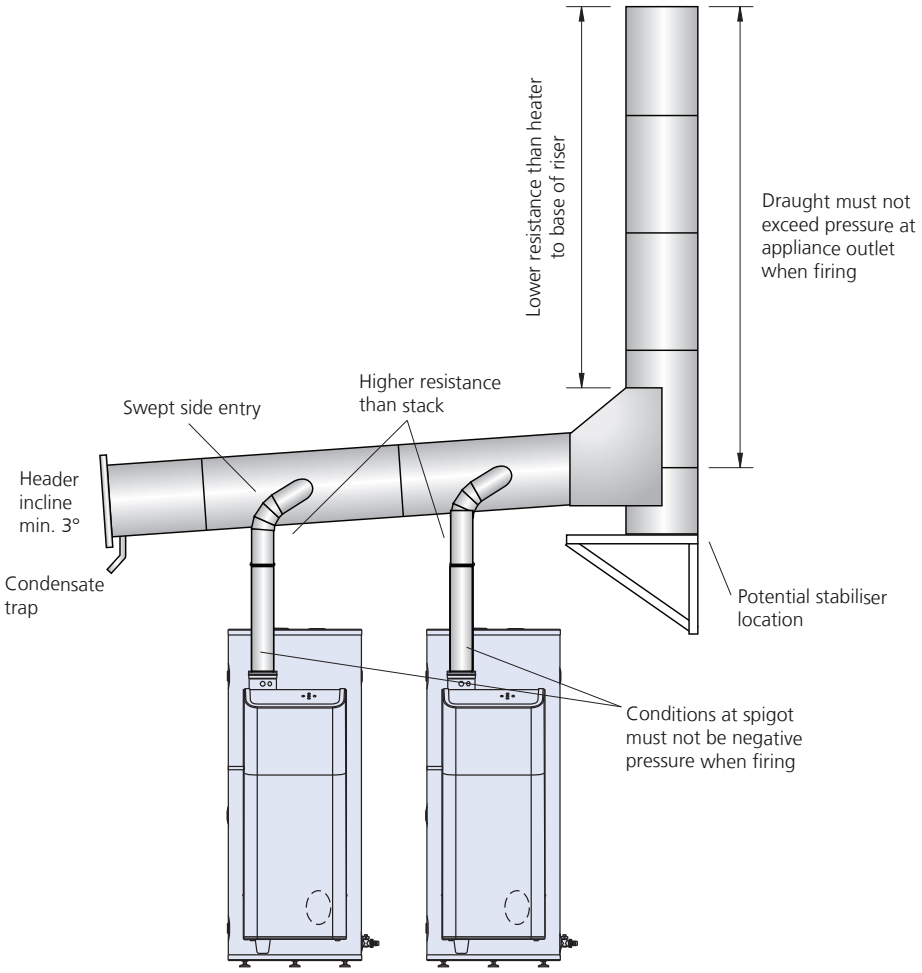
Multiple water heaters - same appliance types

Dorchester DR-CC 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-CC 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.

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.

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-CC 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-CC 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 ¾" (20 mm) relief valve and an open vent 1¼" (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-CC 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 100 kW input energy.

A drain connection is fitted to the water heater 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 50 mm 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 grills will be located within 1metre of floor level for Natural Gas. High level grilles are recommended to be positioned within 15% of the plant 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.

Hydraulic schemes

Unvented cold water supply

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

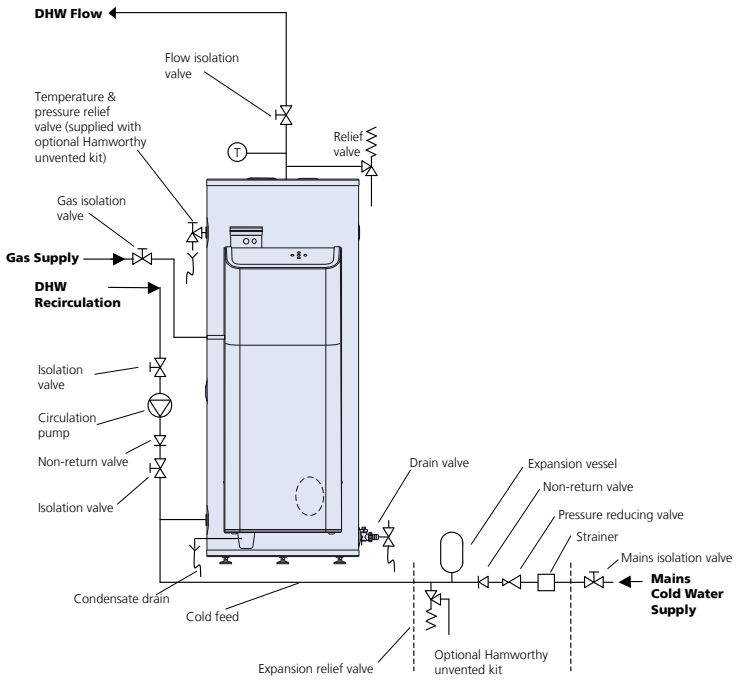
The Water Supply (Water Fittings) regulations 1999 require a number of essential controls pre-set to specific pressure and temperature settings for unvented systems. To ensure the controls are correctly sized for the application, set to appropriate levels and assembled in the correct order, Hamworthy 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.

Unvented cold water supply and single water heater



Open vented cold water supply

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

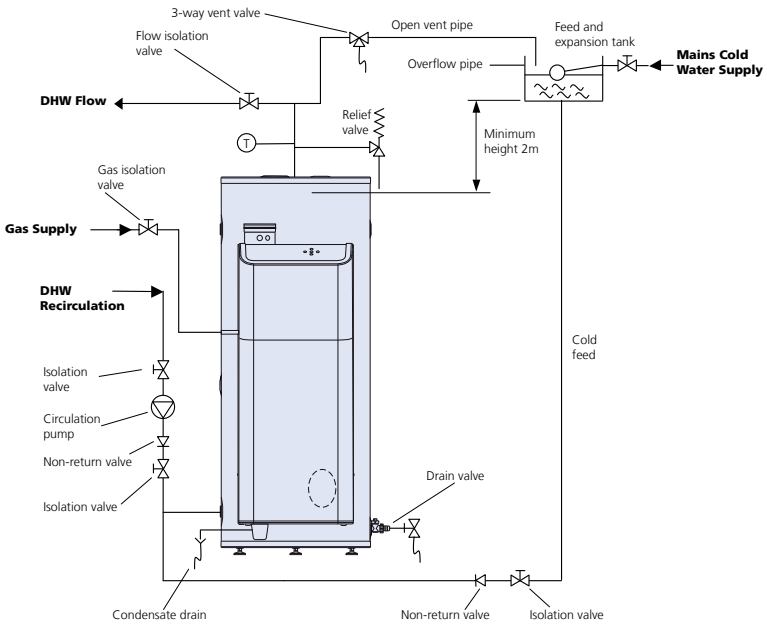
With open vented systems the feed and expansion tank must be sized to provide sufficient cold water storage and accommodate expanded system water without the risk of overflowing.

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.

Open vented cold water supply and single water heater

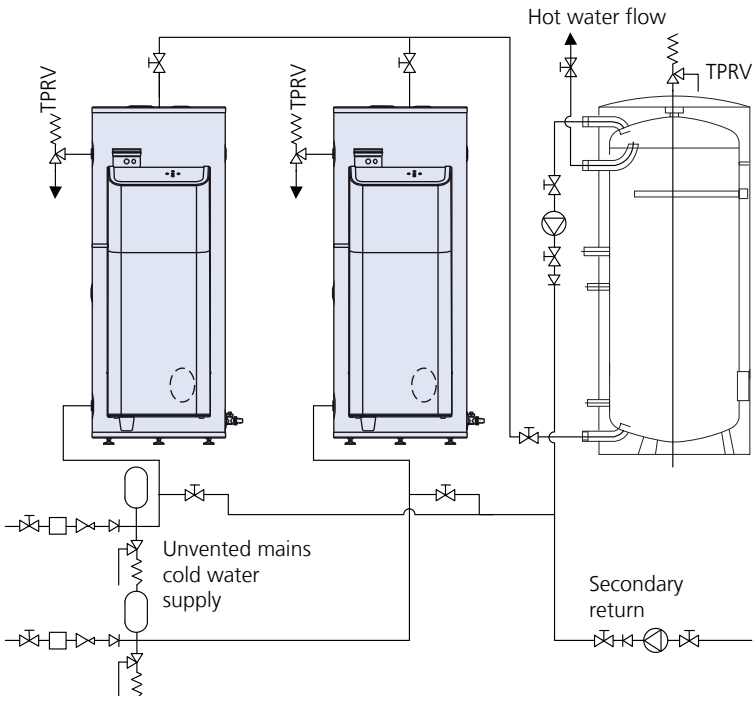


Unvented system: two water heaters and one storage tank

Typical pipework arrangement for two Dorchester DR-CC 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: *two water heaters and one storage tank*



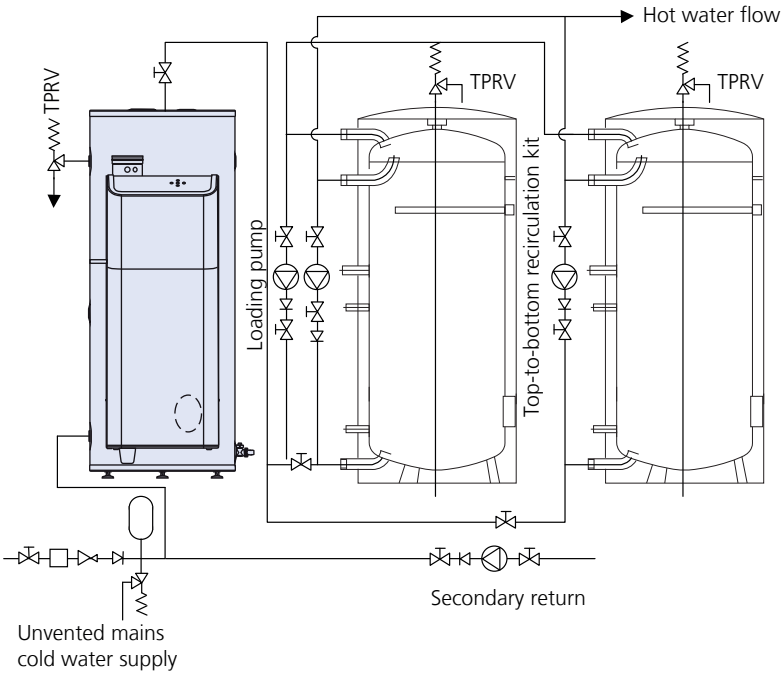
Unvented system: one water heater and two storage tanks

Typical pipework arrangement for a single Dorchester DR-CC 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.

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



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-CC 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.

2 Yr Warranty

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, bolted (13mm) to a wooden pallet base and cardboard wrapped.

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

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

Upton

Purewell VariHeat mk2

Stratton mk2

Wessex Modumax mk3

Ensbury LT

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.

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

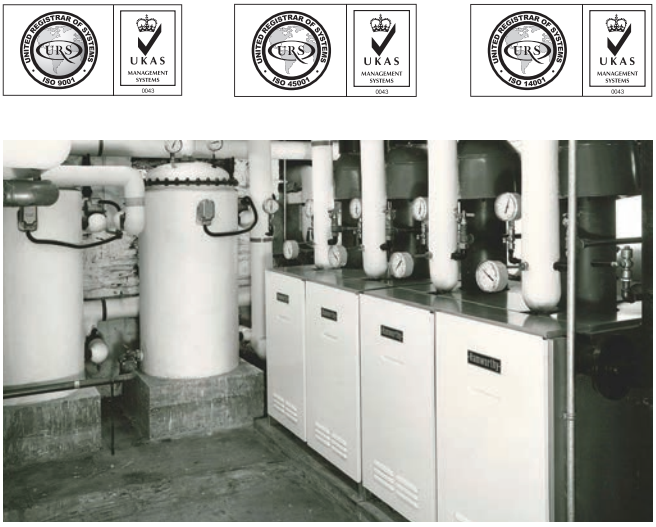
We are an active member of trade associations and professional bodies supporting the industries we work in.

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:

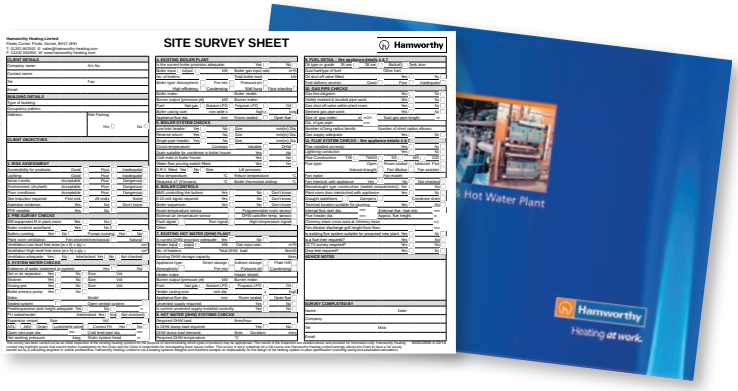
- ISO 9001 Quality Management System
- ISO 14001 Environmental Management System
- ISO 45001 Health and Safety Management System

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



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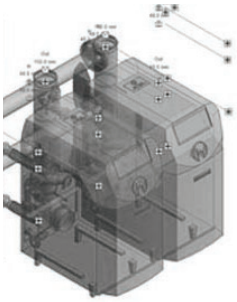
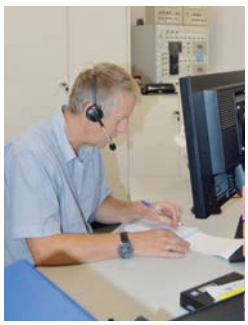


Find out who your local contact is

hamworthy-heating.com/find-your-local-sales-manager

Get information for discontinued products

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.

SUPPORT BRITISH MANUFACTURING

Hamworthy Heating Accreditations
ISO 9001 Quality Management System
ISO 14001 Environmental Management System
ISO 45001 Health & Safety Management System

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