



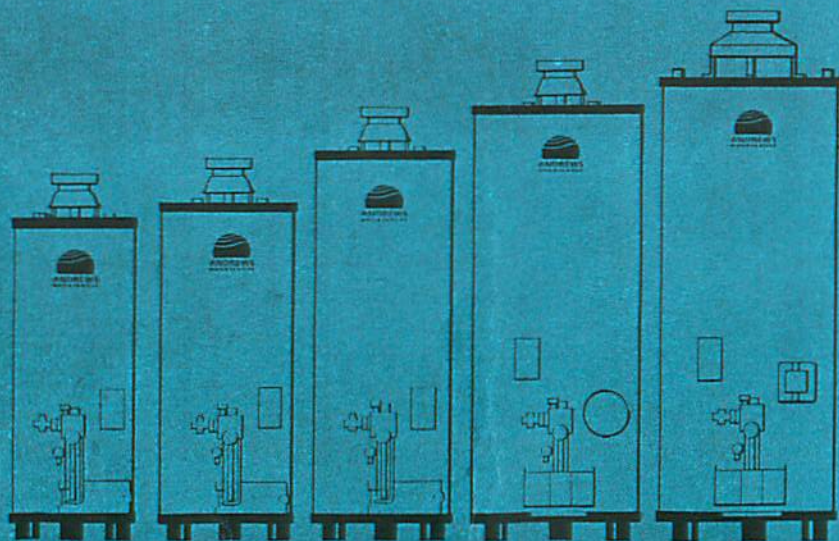
**ANDREWS
WATER HEATERS**

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**ANDREWS
WATER HEATERS**

**Natural Gas Fired
Water Storage Heaters
Standard Range**

**Models 24/39, 32/40, 40/61,
63/71 and 84/87
'G' Series**



**Installation Guide, Operation
and Servicing Manual**

Part No. C699

This manual must be kept with the appliance

JAN CORRISSE & RUNBOX.COM

The purpose of this manual is to provide up to date information necessary to the user for installing, operating and servicing the Heater, together with technical data and spare parts list.

The information given however, may be subject to revision in compliance with the Andrews policy of continual improvement.

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The Andrews Water Heater has been designed and built to give efficient and reliable service. Like any other piece of mechanical equipment, however, the Heater will only operate at maximum efficiency if the correct installation and servicing procedures are followed.

The purpose of this manual is to provide up to date information necessary to the user for installing, operating and servicing the Heater, together with technical data and spare parts list.

IT IS THE LAW THAT THE INSTALLATION BE CARRIED OUT BY A COMPETENT PERSON.

THE HEATER SHOULD BE INSTALLED IN ACCORDANCE WITH THE BRITISH STANDARDS AND CODES OF PRACTICE REFERRED TO IN THIS MANUAL, THE GAS SAFETY (INSTALLATION & USE) REGULATIONS 1994, BUILDING REGULATIONS, MODEL WATER BYE-LAWS AND ANY REQUIREMENTS OF THE LOCAL GAS UNDERTAKINGS, LOCAL AUTHORITY, WATER AND FIRE AUTHORITIES.

This water heater is for use with NATURAL GAS only.

Health and Safety at Work Act, 1974

Under section 6 of the above Act, it is the duty of manufacturers and suppliers of products for use at work to ensure, so far as it is reasonably practicable, that such products are safe and without risk to health when properly used and to make available to users of such products adequate information about their safe and proper operation.

Andrews Heaters should only be used in the manner and purpose for which they were intended, and in accordance with the recommendations detailed in this Manual. Our Heaters have been designed, produced and inspected with safety in mind, but there are certain basic precautions which should be taken by the user and in particular attention is drawn to the safety precautions in this Manual and on the Operating Instructions on the Heater.

It is imperative, therefore, that all persons who may make use of our Heaters have all the information and instruction they require to ensure that they are fully aware of any hazards, and that they know both the purpose and the correct manner of use of our Heaters.

The Andrews water storage heater is supplied for use on an open vented system. When required for use with an unvented system the water heater is supplied by Andrews Water Heaters with an Unvented System Kit.

It is important that in the design of the installation the water heaters are not undersized.

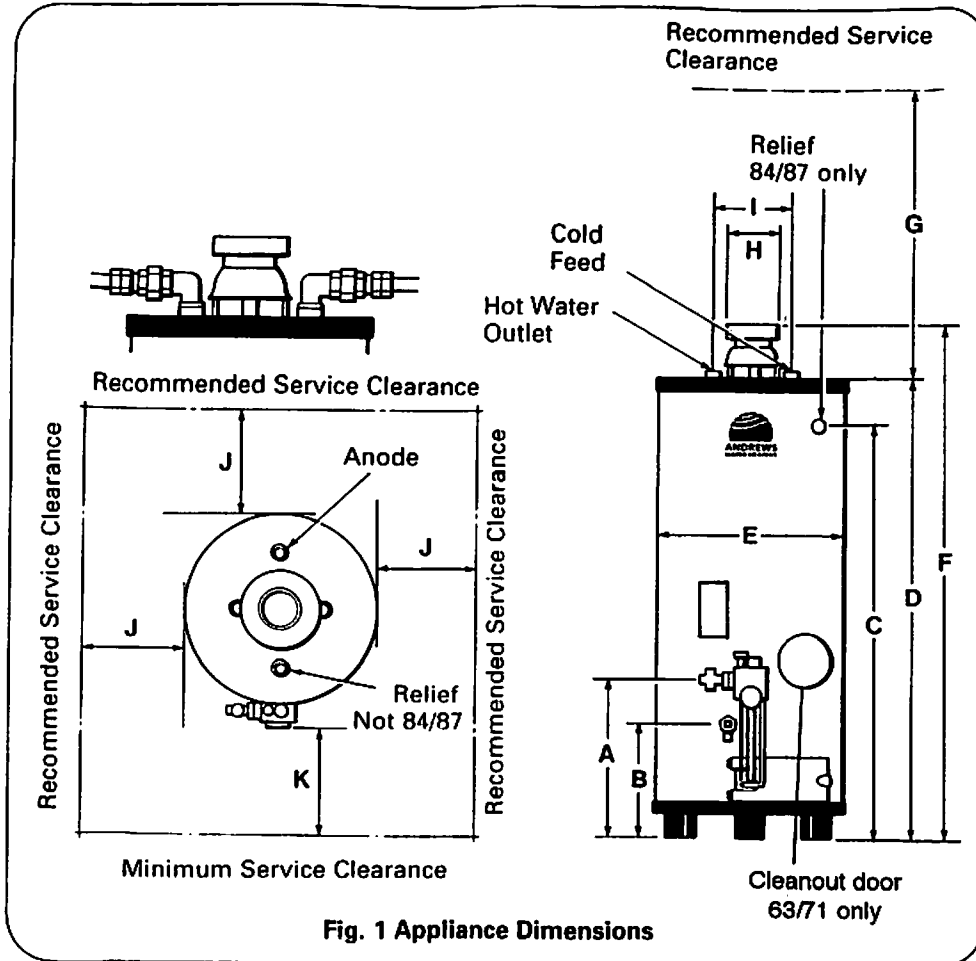


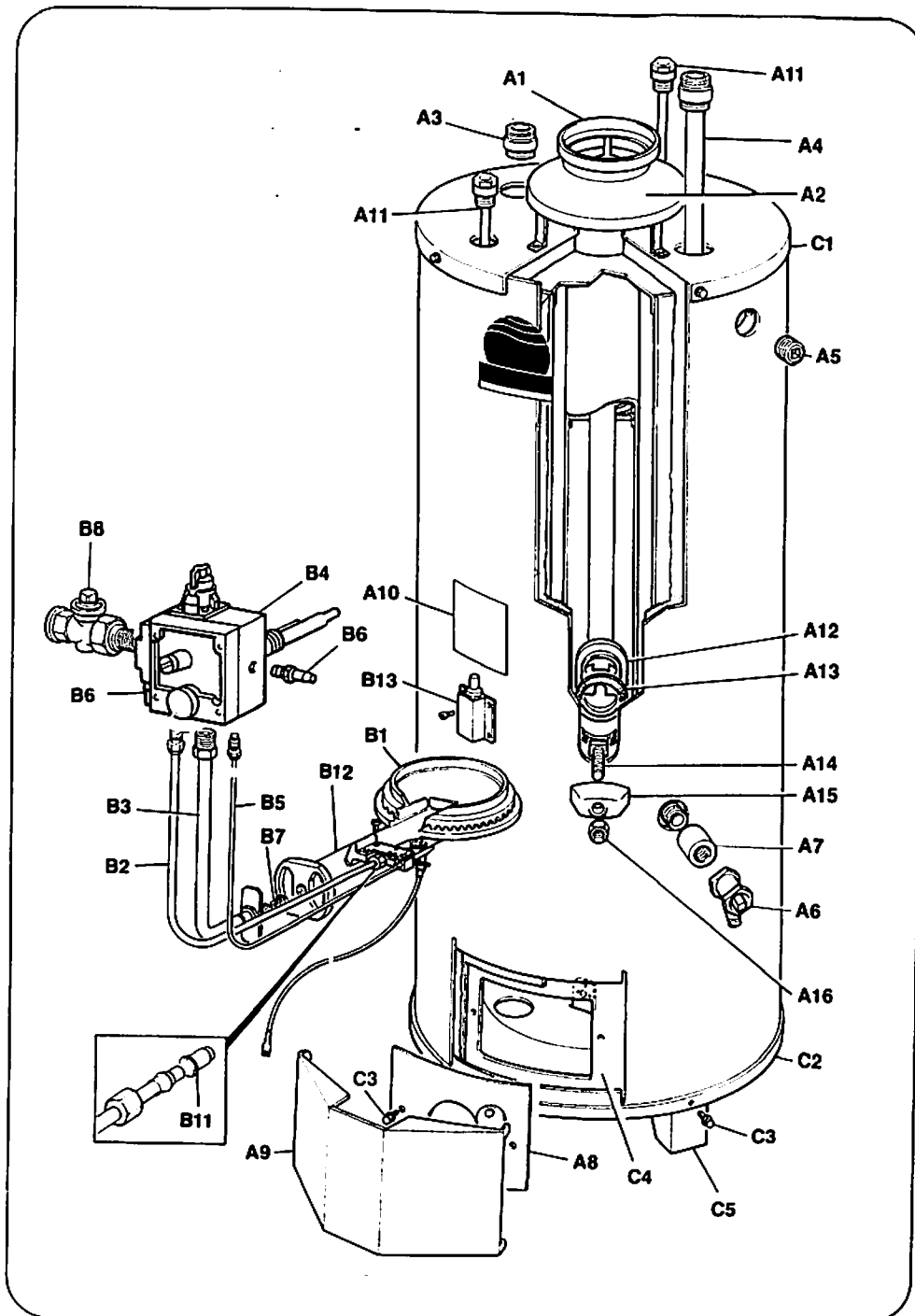
Fig. 1 Appliance Dimensions

Ref	Part No.	Description	Qty
A1	C657	Adaptor Ring	1
A2	C658	Draught Diverter	1
A3	C690	Hot Outlet Nipple	1
A4	C691	Cold Inlet Dip Tube	1
A5	C641	Plug Return Connection	1
A6	C381	Drain Cock	1
A7	C103	Socket Coupler 3/4"	1
A8	C660	Cover Combustion Chamber	1
A9	C293	Cover Burner Access	1
A10	C705	Data Badge	1
A11	C692	Magnesium Anode	2
A12	C693	Hand Hole Plate	1
A13	C694	Gasket	1
A14	C695	Square Head Bolt	1
A15	C696	Clamping Bracket	1
A16	C697	Nut	1
B1	E003	Burner Assy Comprising items B2, B3, B5, B7, B12.	1
B2	C407	Pilot Supply Pipe	1
B3	C997	Burner Supply Pipe	1
B4	C974	Multifunctional Control Robertshaw R110RTS.	1
B5	C684	Thermocouple Robertshaw	1
B6	C136	Pressure Test Nipple	2
B7	C683	Injector	1
B8	C382	Gas Cock	1
B10	C112	Knob Thermostat Gas Cock	1
B11	C252	Pilot Burner Jet Type N18	1
B12	C688	Pilot Burner c/w Jet, pipe, electrode & lead.	1
B13	C514	Piezo Ignitor	1
C1	C670	Top Cover Outer Jacket	1
C2	C669	Base Assy c/w Radiation Pan	1
C3	C689	Screw, Special for Jacket & Burner Cover	10
C4	C664	Combustion Chamber	1
C5	C698	Leg	3

Appliance Dimensions - Standard Range - Natural Gas

63/62.

	24/39	32/40	40/61	63/71	84/87
	SI Metric Imp.	SI Metric Imp.	SI Metric Imp.	SI Metric Imp.	SI Metric Imp.
A	350mm/13½in	350mm/13½in	350mm/13½in	409mm/16½in	401mm/15½in
B	227mm/9in	227mm/9in	227mm/9in	288mm/11½in	273mm/10¾in
C					1506mm/59½in
D	1149mm/45½in	1200mm/47½in	1446mm/56¾in	1526mm/60in	1654mm/65in
E	457mm/18in	508mm/20in	508mm/20in	622mm/24½in	718mm/28½in
F	1276mm/50½in	1327mm/52½in	1589mm/62½in	1669mm/65¾in	1788mm/70¾in
G	762mm/30in	762mm/30in	762mm/30in	1143mm/45in	1270mm/50in
H	100mm/4in	100mm/4in	100mm/4in	125mm/5in	125mm/5in
I	203mm/8in	203mm/8in	203mm/8in	279mm/11in	406mm/16in
J&K	300mm/12in	300mm/12in	300mm/12in	300mm/12in	300mm/12in



Model	24/39	
	SI Metric	Imperial
Storage Capacity	109 litre	24 gallons
Recovery Rate Vol/hr thru' 44°C 80°F	178 l/h	39 gph
Heat Input	12.0 kW	40,946 Btu/hr
Gas Flow Rate	0.0187 m ³ /min	0.6593 ft ³ /min
Inlet & Flow Connections	R1	1 in BSPT/Ext
Return Connection	Rp ³ / ₄	³ / ₄ BSP P/Int
Weight Empty	43 kg	94 lb
Weight Full	151 kg	334 lb
Hydraulic Working Pressure (Max)	3.5 bar	50.8 psi
Hydraulic Working Pressure (Min)	0.15 bar	2.2 psi
Gas Family	1 ₂ H (Natural)	
Gas Connection	Rp ¹ / ₂	¹ / ₂ BSP Int
Burner Pressure	10.0 mbar	4.0 wg
Injector Diameter	2.95 mm	0.116 in
Shipping Weight	44 kg	98 lb
Shipping Dimension Carton	546 x 486 x 1190 mm	21 ¹ / ₂ x 19 ¹ / ₈ x 46 ⁷ / ₈ in

Maximum Test Pressure 8.62 bar 125 psi.

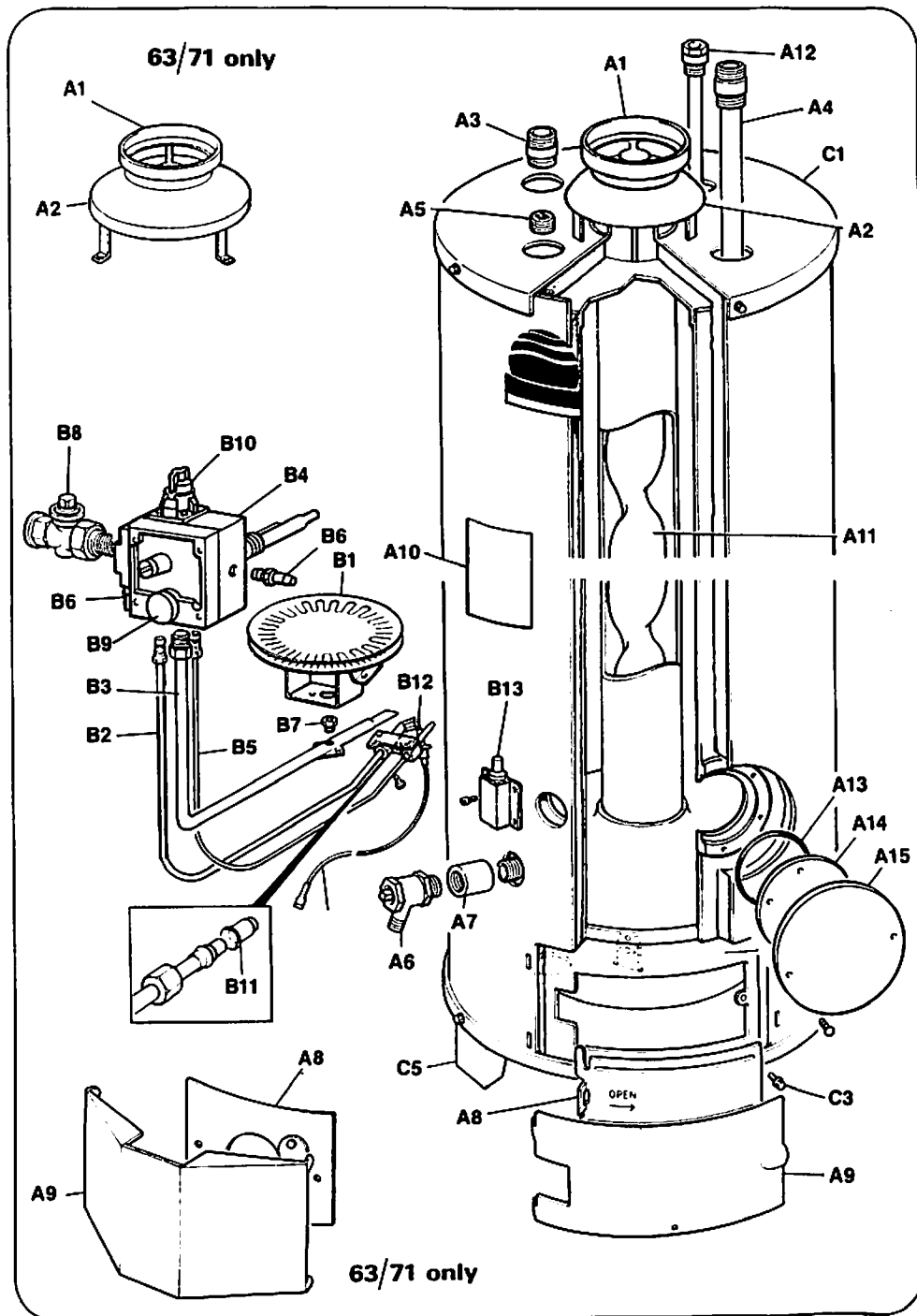
Technical Data

Model	32/40	
	SI Metric	Imperial
Storage Capacity	145 litre	32 gallons
Recovery Rate Vol/hr thru' 44°C 80°F	183 l/h	40 gph
Heat Input	12.5 kW	42,650 Btu/hr
Gas Flow Rate	0.0194 m ³ /min	0.687 ft ³ /min
Inlet & Flow Connections	R1	1 in BSPT/Ext
Return Connection	Rp ^{3/4}	^{3/4} BSP P/Int
Weight Empty	57 kg	126 lb
Weight Full	202 kg	446 lb
Hydraulic Working Pressure (Max)	3.5 bar	50.8 psi
Hydraulic Working Pressure (Min)	0.15 bar	2.2 psi
Gas Family	1 ₂ H (Natural)	
Gas Connection	Rp ^{1/2}	^{1/2} BSP Int
Burner Pressure	10.0 mbar	4.0 wg
Injector Diameter	3.05 mm	0.120 in
Shipping Weight	57 kg	126 lb
Shipping Dimension Carton	587 x 537 x 1241 mm	21 ^{1/8} x 21 ^{1/8} x 48 ^{7/8} in

Maximum Test Pressure 8.62 bar 125 psi.

Parts List Models- 24/39, 32/40, 40/61, 63/71

Model	24/39	32/40	40/61	63/71	Description	Qty
Ref	Part No.	Part No.	Part No.	Part No.		
A1	C654	C654	C654	C657	Adaptor Ring	1
A2	C653	C653	C655	C656	Draught Diverter	1
A3	C285	C285	C285	C285	Hot Outlet Nipple	1
A4	C286	C292	C293	C293	Cold Inlet Dip Tube	1
A5	C641	C641	C641	C641	Plug Return Connection	1
A6	C381	C381	C381	C381	Drain Cock	1
A7	C103	C103	C103	C103	Socket Coupler ^{3/4} "	1
A8	C449	C449	C449	C660	Cover Combustion Chamber	1
A9	C450	C450	C451	C329	Cover Burner Access	1
A10	C701	C702	C703	C704	Data Badge	1
A11	C671	C671	C672	C673	Flue Baffle	1
A12	C288	C289	C290	C291	Magnesium Anode	1
A13	N/A	N/A	N/A	C299	Cleanout Pad Seal	1
A14	N/A	N/A	N/A	C300	Cleanout Pad	1
A15	N/A	N/A	N/A	C301	Cleanout Pad Cover	1
B1	C998	C999	E001	E002	Burner Assy comprising items B2, B3, B5, B7, B12.	1
B2	C405	C406	C406	C407	Pilot Supply Pipe	1
B3	C993	C994	C994	C996	Burner Supply Pipe	1
B4	C965	C965	C965	C966	Multifunctional Control White Rogers	1
B5	C684	C684	C684	C684	Thermocouple Robertshaw 2C	1
B6	C136	C136	C136	C136	Pressure Test Nipple	2
B7	C679	C680	C681	C682	Injector	1
B8	C382	C382	C382	C382	Gas Cock	1
B10	C112	C112	C112	C112	Knob Thermostat Gas Cock	1
B11	C252	C252	C252	C252	Pilot Burner Jet Type N18	1
B12	C685	C686	C686	C687	Pilot Burner c/w Jet, Pipe, Electrode and Lead	1
B13	C514	C514	C514	C514	Piezo Ignitor	1
C1	C464	C465	C465	C466	Top Cover Outer Jacket	1
C2	C416	C417	C417	C668	Base assy c/w Radiation Pan	1
C3	C689	C689	C689	C689	Screw, Special for Jacket	10
C4	C661	C662	C662	C663	Combustion Chamber	1
C5	N/A	N/A	N/A	C689	Leg	3



Model	40/61	
	SI Metric	Imperial
Storage Capacity	182 litre	40 gallons
Recovery Rate Vol/hr thru' 44°C 80°F	278 l/h	61 gph
Heat Input	18.5 kW	63,122 Btu/hr
Gas Flow Rate	0.0288 m ³ /min	1.016 ft ³ /min
Inlet & Flow Connections	R1	1 in BSPT/Ext
Return Connection	Rp ^{3/4}	3/4 BSP P/Int
Weight Empty	65 kg	144 lb
Weight Full	247 kg	544 lb
Hydraulic Working Pressure (Max)	3.5 bar	51.5 psi
Hydraulic Working Pressure (Min)	0.15 bar	2.2 psi
Gas Family	1 _{2H} (Natural)	
Gas Connection	Rp ^{1/2}	1/2 BSP Int
Burner Pressure	10.0 mbar	4.0 wg
Injector Diameter	3.66 mm	0.144 in
Shipping Weight	68 kg	150 lb
Shipping Dimension Carton	587 x 537 x 1489 mm	23 ^{1/8} x 21 ^{1/8} x 58 ^{5/8} in

Maximum Test Pressure 8.62 bar 125 psi.

Technical Data

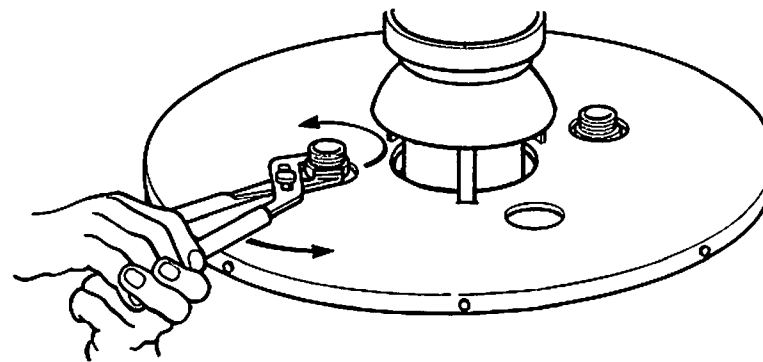
Model	63/71	
	SI Metric	Imperial
Storage Capacity	286 litre	63 gallons
Recovery Rate Vol/hr thru' 44°C 80°F	324 l/h	71 gph
Heat Input	22.0 kW	75,064 Btu/hr
Gas Flow Rate	0.0342 m ³ /min	1.209 ft ³ /min
Inlet & Flow Connections	R1	1 in BSPT/Ext
Return Connection	Rp ^{3/4}	^{3/4} BSP P/Int
Weight Empty	110 kg	244 lb
Weight Full	396 kg	874 lb
Hydraulic Working Pressure (Max)	3.5 bar	51.5 psi
Hydraulic Working Pressure (Min)	0.15 bar	2.2 psi
Gas Family	1 ₂ H (Natural)	
Gas Connection	Rp ^{1/2}	^{1/2} BSP Int
Burner Pressure	10.0 mbar	4.0 wg
Injector Diameter	4.10 mm	0.161 in
Shipping Weight	120 kg	264 lb
Shipping Dimension Carton	692 x 651 x 1702 mm	27 ^{1/4} x 25 ^{5/8} x 67 in

Maximum Test Pressure 8.62 bar 125 psi.

Fault Finding

Section V

FAULT	ACTION
8. WATER TEMPERATURE TOO LOW	(a) Reset thermostat to higher temperature. (b) Check gas pressures at burner and at gas inlet to appliance.
9. NOT ENOUGH HOT WATER	(a) Check gas pressures at burner and at gas inlet to appliance. (b) Check amount of water being used against recovery rate given on Data Plate.
10. WATER DRIPPING FROM BASE OF HEATER	(a) Check if water stops dripping when water in heater is hot. If water stops problem is condensation caused by incorrectly designed flue or by tank cooling excessively i.e. more hot water being used than recovery rate of the heater. (b) If water continues to drip when heater is hot. Problem is a leaking joint or storage vessel.
11. RUMBLING NOISE (KETTLING)	(a) Scale formation in heater, consult water treatment specialist. Heater must be descaled and suitable water treatment provided to avoid problem re-occurring.



Disconnect pipe fittings and turn nipple anti clockwise to remove.

Fig. 12 Removal of Cold Inlet Dip Tube & Hot Outlet Nipple

FAULT	ACTION
1. WATER DOES NOT GET HOT	(a) Check gas cock is open. (b) Check water valves are open. (c) Check that pilot is alight. (d) Check thermostat setting. (Reset to higher temperature). (e) Check gas pressures at burner and at gas inlet to appliance. (f) Check cold inlet dip tube to see if it is broken or missing (see Fig. 12).
2. PILOT FLAME IS OUT	(a) Try to light burner as detailed in lighting instructions. (b) Pilot will not light wait 3 mins and try again then see below.
3. PILOT WILL NOT STAY ON	(a) Check gas available. (b) Check thermocouple, replace if necessary. (c) Check inlet gas pressure as this may be too high or too low. Inlet gas pressure to heater multifunctional control should be 17.5 mbar (7"Wg) to 25 mbar (10"Wg). (d) Pilot jet blocked, clean or replace pilot jet. (e) Faulty magnet, replace multifunctional control. (f) E.C.O. safety thermostat operating at too low a temperature. Replace multifunctional control.
4. BURNER WILL NOT LIGHT - PILOT ESTABLISHED	(a) Water already at correct temperature. (b) Replace multifunctional control.
5. THERMOCOUPLE BURNS OUT FREQUENTLY	(a) Check pilot pipe for loose joints. (b) Check that correct amount of fresh air ventilation is available. (c) Check that flue is clear and is correctly designed and that the British Gas Tested and Certified flue terminal is correctly positioned. (d) Check for presence of halogen vapours (see page 11).
6. HEATER SOOTING, YELLOW FLAME (POOR COMBUSTION)	(a) Clean burner and injector. (b) Flue obstruction, clean flueways. (c) Check flue design and termination position. (d) Check burner pressure. (e) Check for correct ventilation.
7. WATER TEMPERATURE TOO HIGH	(a) Reset thermostat to lower temperature. (b) If water temperature is still too high replace multifunctional control.

Model	84/87	
	SI Metric	Imperial
Storage Capacity	382 litre	84 gallons
Recovery Rate Vol/hr thru' 44°C 80°F	397 l/h	87 gph
Heat Input	26.0 kW	88,712 Btu/hr
Gas Flow Rate	0.0405 m ³ /min	1.4285 ft ³ /min
Inlet & Flow Connections	R1¼	1¼ in BSPT/Ext
Return Connection	Rp¾	¾ BSP P/Int
Weight Empty	181 kg	400 lb
Weight Full	562 kg	1240 lb
Hydraulic Working Pressure (Max)	3.5 bar	50.8 psi
Hydraulic Working Pressure (Min)	0.15 bar	2.2 psi
Gas Family	1 _{2H} (Natural)	
Gas Connection	Rp1½	½ BSP Int
Burner Pressure	10.0 mbar	4.0 wg
Injector Diameter	4.22 mm	0.166 in
Shipping Weight	194 kg	428 lb
Shipping Dimension Carton	914 x 762 x 1807 mm	36 x 30 x 71½ in

Maximum Test Pressure 8.62 bar 125 psi.

Installation must be carried out by a competent person.

Install in accordance with current British Standard Code of Practice 342 part 2 and British Standards 5440, 5546, 6644, 6700, 6798 and 6891.

A. Location

The location chosen for the heater must permit the provision of a satisfactory flue and an adequate air supply.

The heater must not be installed in a room which contains a bath or a shower and must not be installed in a bedroom or bedsitting room.

A clearance of 300mm (12in) should be left around the heater for fitting and servicing purposes and 762mm (30in) above the heater for removal of the flue baffle. The above clearances are recommended for ease of servicing. They can be reduced if necessary but a clearance of 300mm (12 in) must be left in front of heater for access to the burner and controls. The flue baffle clearance should also be maintained if possible to avoid servicing problems.

The floor on which the heater is installed must be flat, level and of sufficient strength to withstand the weight of the heater when filled with water, and should satisfy the requirements of the Local Authority & Building Regulations.

Any combustible material adjacent to the heater must be so placed or shielded as to ensure that its temperature does not exceed 65°C (150°F).

B. Flue System

Detailed recommendations for flueing are given in IM11 and BS 5440 part 1. The following notes are intended to give general guidance:

Fit the draught diverter feet in the location holes on top of the water heater. Light quality asbestos to BS 567, mild steel to BS 715 or stainless steel flue can then be fitted to the spigot on top of the diverter. Fit a split flue clip or flange joint close to the diverter for servicing purposes.

The flue must terminate with a British Gas tested flue terminal in accordance with the relevant recommendations given to BS 5440 part 1, table 4. The height from the roof to the base of the terminal is given in the table on page 9.

Flue pipes, flue linings and fittings should be of a type tested and certified by British Gas plc.

IMPORTANT

Magnesium Anode

A magnesium sacrificial anode is fitted into the top of the water storage vessel. The function of the anode is to provide additional corrosion protection for the inside of the vessel. The condition of the anode should be checked, at least annually, during servicing. The original diameter of the anode is 22mm (7/8"). If at any point along its length, the anode is eroded to half, or less, of the original diameter it should be replaced with new. Particular attention should be paid to the extreme ends.

If the anode is encrusted with limescale it should be either cleaned by wire brushing to reveal bright metal or replaced.

Where correx anodes are fitted no anode maintenance is required.

Cleaning the Storage Vessel

Scale formation in the base area of the storage vessel may occur in hard water areas. It is usually associated with high usage and high water temperatures. It is characterised by a rumbling noise (kettling) when the burner is lit and should be rectified by chemical descaling.

DESCALING INFORMATION

When descaling the water storage heater your attention is drawn to the following guidelines.

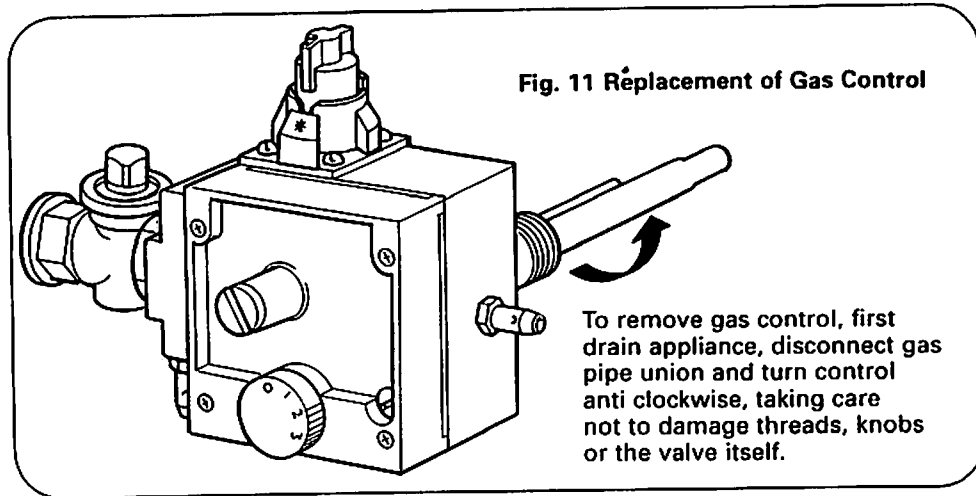
SAFETY FIRST - DUE TO THE CORROSIVE NATURE OF THE DESCALE FLUID IT IS ESSENTIAL THAT SUITABLE PROTECTIVE CLOTHING EQUIPMENT IS USED AND ADEQUATE VENTILATION IS AVAILABLE WHEN DESCALING.

1. Turn gas control on water heater to 'OFF' position and isolate the gas supply.
2. Close water inlet valve and drain heater tank.
3. Remove magnesium sacrificial anode(s).
Note: It is recommended that new anode(s) is/are fitted.
4. Add suitable hydrochloric based descale acid, the requirement is normally 5 litres for Standard range or more dependent on the amount of limescale present.
5. After a minimum of one hour restore gas supply and turn on main gas burner for 2 minutes (MAXIMUM).
6. Isolate gas supply and drain off descale fluid through drain port.
7. Open cold water feed valve and fill heater tank.
8. Drain and flush out heater for minimum of 30 minutes.
9. Replace anodes.
10. Restore gas supply and re-light heater.

- Allow 3 minutes for any unburnt gas to disperse and light the pilot flame, check that the flame is correct, see Fig. 8. Slide the inner door to the left (63 and 84 gallon units, lower the inspection port) and turn the gas control knob to 'ON', the main burner will light.
- Check the main burner tube connection at the control valve with leak fluid and seal if necessary. Replace the outer cover.

Gas Control Valve

This should be checked and serviced by an engineer fully conversant with every aspect of this piece of equipment.



Flueway

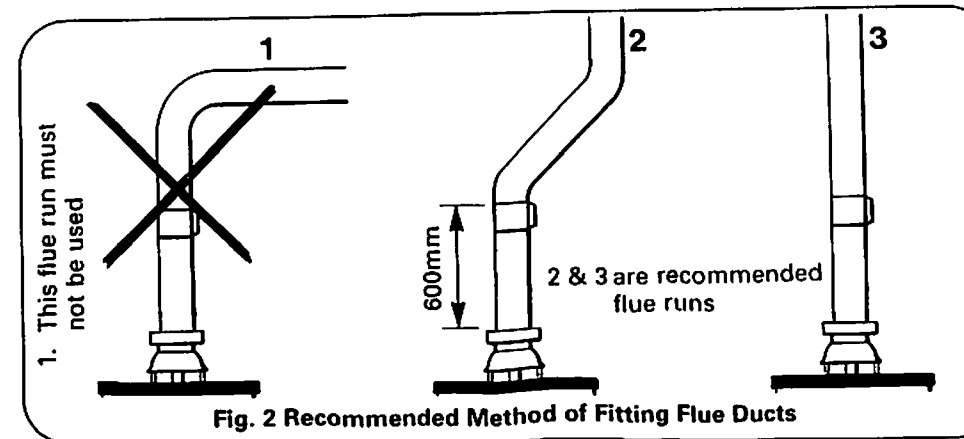
The burner and flueway should be checked annually and if necessary cleaned as follows:-

- Depress slightly the gas control knob and turn to "OFF". Remove outer burner cover and slide inner door to the right. (63 and 84 gallon units, remove the fixing screws to remove the inner cover.
 - Disconnect burner gas tube, pilot tube and thermocouple at gas control.
 - Remove burner assembly complete with pipes and thermocouple.
 - Remove split flue clip from the flue and lift off the draught diverter.
 - Inspect and clean the secondary flue installation as necessary.
 - Lift out the baffle from inside the central flueway. (Not the 84 gallon unit).
 - Clean the flueway with a brush and clean any deposit from the underside of the storage vessel bottom and from the flue baffle.
 - Re-assemble in the reverse order.
- IT IS IMPORTANT THAT THE BURNER IS CORRECTLY LOCATED IN THE BURNER SUPPORT BRACKET ON BASE OF COMBUSTION CHAMBER. DO NOT OVERTIGHTEN THE THERMOCOUPLE CONNECTION.** Screw in hand tight and tighten an extra 1/4 turn with a spanner.
- Re-light and carry out commissioning check as above.

Minimum Heights from Roof to Base of Flue Terminal						
Type of roof		Not within 1.5m (5ft) of a vertical surface of a structure ‡ on the roof		Within 1.5m (5ft) of a vertical surface of a structure ‡ on the roof		
		Internal Route		External Route	Internal Route	External Route
		On Ridge	Not on Ridge			
Pitched	Pitch exceeding 30°	At or above ridge level	1m (3.3 ft) above roof intersection	The base of the terminal should be 250 mm (10 in) above the level of the adjacent roof edge	The base of the terminal should be 250 mm (10 in) above the level of the top of the structure	
	Pitch not exceeding 30°		250 mm (10 in) above roof intersection			
Flat	With parapet	Not applicable	600 mm (2 ft) above roof intersection			
	Without parapet		250 mm (10 in) above roof intersection			

‡ Chimney stack, dormer window, tank room, lift motor room, parapet etc.

If using an existing brick chimney it should be swept clean before connecting the flue and should be suitably lined with an approved lining. As far as practical the flue should rise continuously to the terminal avoiding the use of 90° bends where a change of direction is required. Horizontal and very shallow runs of flue should be avoided since they impede the flow of gases and increase local cooling. (See fig. 2)



C. Air Supply

Detailed recommendations for air supply are given in BS 5440 part 2 and BS 6644.

The following notes are intended to give general guidance:

Where the heater is to be installed in a room or internal space the heater requires the room or internal space containing it to have a permanent air vent. The vent must be either direct to outside air or to an adjacent room or internal space which must itself have a permanent vent of at least the same size direct to outside air. The minimum effective area of the permanent air vent(s) required is as follows:

4.5 cm² per kW in excess of 7 kW
(1 in² per 5000 Btu/h in excess of 25000 Btu/h)

Where the heater is to be installed in a compartment, permanent air vents are required in the compartment at high and low level. These air vents must either communicate with a room or internal space or be direct to outside air.

The minimum effective areas of the permanent air vents required in the compartment are as follows:-

Position of Air Vents	Air Vent Areas	
	Air from room or internal space	Air direct from outside
High Level	9cm ² per kW (2in ² per 5000 Btu/h)	4.5cm ² per kW (1in ² per 5000 Btu/h)
Low level	18cm ² per kW (4in ² per 5000 Btu/h)	9cm ² per kW (2in ² per 5000 Btu/h)

Note: - Both air vents must communicate with the same room or internal space or must both be on the same wall to outside air.

Where compartment air vents are open to a room or internal space, the room or internal space must itself have a permanent air vent(s) as previously specified. For multiple installations where the total heat input exceeds 60 kW (204,720 Btu's/hr), reference must be made to BS 6644. The table opposite should be used to calculate requirements. Detailed recommendations are given in BS 6644 Clause 19. The following notes are intended to give general guidance. Ventilation shall prevent the heater environment from exceeding 32°C (90°F).

The purpose provided space housing the heater(s) must have permanent air vents communicating directly with the outside air, at high and low level. Where communication with the outside air is possible only by means of high level air vents, ducting down to floor level for the lower vents should be used.

For an exposed building, air vents should be fitted preferable on all four sides, but on at least two sides.

Air vents should have negligible resistance and must not be sited in any position where they are likely to be easily blocked or flooded or in any position adjacent to an extraction system which is carrying flammable vapour.

When properly installed and adjusted the Heater will require the minimum of attention. Should it become necessary to completely drain the heater, close the cold water inlet valve, open a hot water tap to allow air to enter the system. Fit a suitable hose to the drain cock and open.

Whenever the Heater is filled with cold water, condensation will form on the cold storage vessel surfaces when the burner is lit. Condensation is normal and does not indicate a leak. It will disappear when the storage vessel becomes heated.

The gas control fitted to this heater has a built in limit thermostat (ECO). In case of high water temperature the gas supply will be automatically shut off. The reason for such a high temperature must be investigated and corrected before the heater is relit. The gas control is fitted with a recycling type ECO, this means that once the water temperature has cooled sufficiently the ECO circuit will close and allow the heater to be relit. If the gas control has to be changed it must be replaced with an identical model having the same code number.

If in doubt contact Andrews Water Heaters.

Section IV

Servicing

Whilst giving the following instructions for the care of the Andrews Water Heater, we would recommend that an arrangement is made with your local gas region or installer to carry out periodic checks of the appliance to ensure trouble free operation and continued satisfaction.

Burner Assembly

The burner assembly should be cleaned and checked annually as follows:-

- Depress slightly, the gas control knob and turn to "OFF". Remove the outer burner cover and slide the inner door to the right. (63 and 84 gallon units, remove the two fixing screws to remove the inner cover).
- Disconnect from the bottom of the control valve the 'pilot tube, thermocouple and main burner supply tube. Withdraw the burner assembly from the heater.
- Remove the screw securing the pilot assembly to the main burner.
- Remove the gland nut connecting the pilot tube to the pilot assembly. Withdraw the pilot tube and remove the pilot restrictor from the end. Clean the pilot restrictor with acetone and blow through the pilot burner with compressed air.
- Remove the two screws securing the main burner supply tube to the bottom of the burner to gain access to the main jet. Remove the main jet and clean with acetone. Blow through the main burner with compressed air.
DO NOT ATTEMPT TO CLEAN ORIFICES WITH SHARP METALLIC OBJECTS, IF NECESSARY, USE A WOOD SPLINTER TO CLEAR.
- Re-assemble in the reverse order of steps 2 to 5 but note:
 - Be sure to engage the rear section of the main burner supply pipe in its location bracket on the base pan of the heater.
 - DO NOT OVERTIGHTEN THE THERMOCOUPLE CONNECTION, SCREW IN FINGER TIGHT AND TIGHTEN A FURTHER 1/4 TURN USING A SPANNER.**
 - 63 and 84 gallon units, replace the inner cover and secure using the two screws.
- Turn the gas control knob to "PILOT" and depress. Using a leak detection fluid check the joints at both ends of the pilot supply tube. Seal if necessary.

To Shut Off the Burner

For long periods only, eg. holidays or periods of 7 days or more, turn the gas control knob to 'PILOT' position, depress slightly and turn clockwise to 'OFF'. Turn off the gas service cock.

For shorter periods, eg. less than 7 days, leave the heater under the control of the thermostat.

N.B. If the pilot should become extinguished for any reason, turn off the appliance, and wait three minutes before attempting to relight.

TO CHECK MAIN BURNER PRESSURE

1. Turn burner OFF as above.
2. Remove brass cap from burner pressure adjustment port. (see below).
3. Release bleed screw A one turn and connect pressure gauge tube.
4. Light burner according to the preceding instructions.
5. Adjust burner pressure at screw B in accordance with data plate. Turn screw clockwise to increase pressure and anticlockwise to decrease pressure.
6. Turn burner OFF. Remove pressure gauge tube and tighten screw A.
7. Replace brass cap in burner pressure adjustment port. (see below).

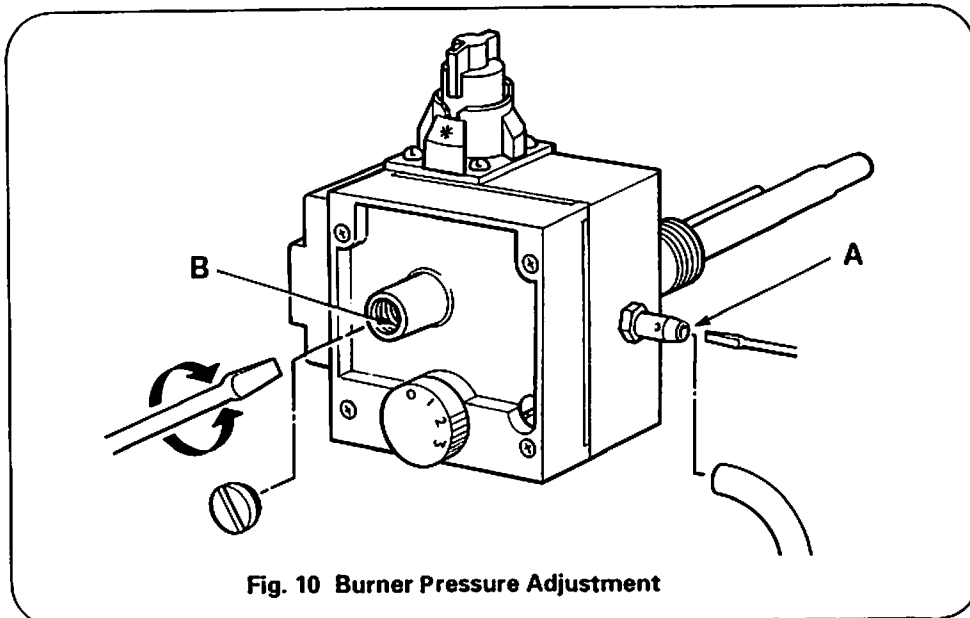


Fig. 10 Burner Pressure Adjustment

Grilles or louvres should be so designed that high velocity air streams do not occur within the space housing the heater(s).

The grilles should have a total minimum free area for the water heater(s) in addition to any other requirements as follows:-

Low-Level (inlet)	540cm ² plus 4.5cm ² per kilowatt in excess of 60 kW total rated input
High-Level (outlet)	270cm ² plus 2.25cm ² per kilowatt in excess of 60kW total rated output

IMPORTANT:

1. The effective area requirements specified in the table are related to the maximum heat input of the heater(s), and are equivalent to those specified in BS 6644.
2. The free area of the grilles should not be less than the size of the recommended ventilation opening.
3. The supply of air to a space housing the heater(s) by mechanical means should be:-
 - (a) Mechanical inlet with natural extraction.
 - (b) Mechanical inlet with mechanical extraction.

NB!! Natural inlet with mechanical extraction must not be used.

Where a mechanical inlet and mechanical extraction system is used, the design extraction rate must not exceed one third of the design inlet rate.

All mechanical ventilation systems must be fitted with automatic gas shut off safety systems which cut off the supply of gas to the heater(s) in the event of failure of either the inlet or extract fans.

The requirements for air supply by mechanical ventilation are given in BS 6644 Clause 19.3.

The permanent air vents shall be sited away from any extract fans. Where an extract fan is fitted, check for spillage at the draught diverter as set out in BS 5440 part 1, appendix B. It may be necessary to increase the ventilation area to compensate for the extractor fan.

4. Some halogen containing compounds can cause rapid corrosion of the Gas Burner, Thermocouple and Storage Vessel if drawn into the combustion air.

Therefore, if heaters are to be installed in any of the following locations or in any applications where the above compounds are present they should be sealed off from atmospheres which may contain these compounds, and all ventilation air must be taken completely from outside.

- (i) Hairdressing salons and adjoining rooms or basement.
- (ii) Establishments where dry cleaning solutions are used.
- (iii) Industrial use near chemical de-greasing processes or where solvents are used or stored.
- (iv) Installations where refrigerant gases are used or stored.

D. Water Connections - Vented Systems

The water heater must be supplied from a cold water feed cistern and the hot water supply pipe must be fitted with an open vent pipe in accordance with BS 5546 and 6644. Local regulations and bye-laws must be observed when installing the system but typical water service layouts are shown in Figs. 3 and 4.

The cold water feed cistern must have an actual capacity greater than the hourly recovery rate of the heater or heaters to which it is fitted, the minimum actual capacity allowed for a feed cistern is 50 gall (227 litres) ref. bye-law 30.

The actual cistern capacity is the capacity to the normal water line of the cistern. All cisterns used should be to the relevant British Standard and the distance from the normal water line to the top of the cistern should be as laid down by the water authorities.

The cold water inlet and hot water outlet are identified on top of the heater. Connect the cold water feed and hot water outlet to these nipples with union adaptors for ease of servicing. (See Servicing Section 4).

CAUTION - DO NOT APPLY HEAT TO THESE NIPPLES IF MAKING CAPILLARY SOLDERED JOINTS AS THEY ARE FITTED WITH PLASTIC INSERTS. MAKE THE CAPILLARY JOINTS TO THE PIPES BEFORE CONNECTING TO THE HEATER. A DRAIN COCK IS SUPPLIED WITH THE HEATER AND THIS SHOULD BE FITTED TO THE APPROPRIATE BOSS AS SHOWN ON THE DRAWING.

After installation of the water system open the main water supply valve, flush the system and fill the heater. Open the hot taps to allow air to escape from the system. When the system is free of air, close the taps and check for leaks at the gas control thermostat, drain cock and pipe connections at the top of the heater.

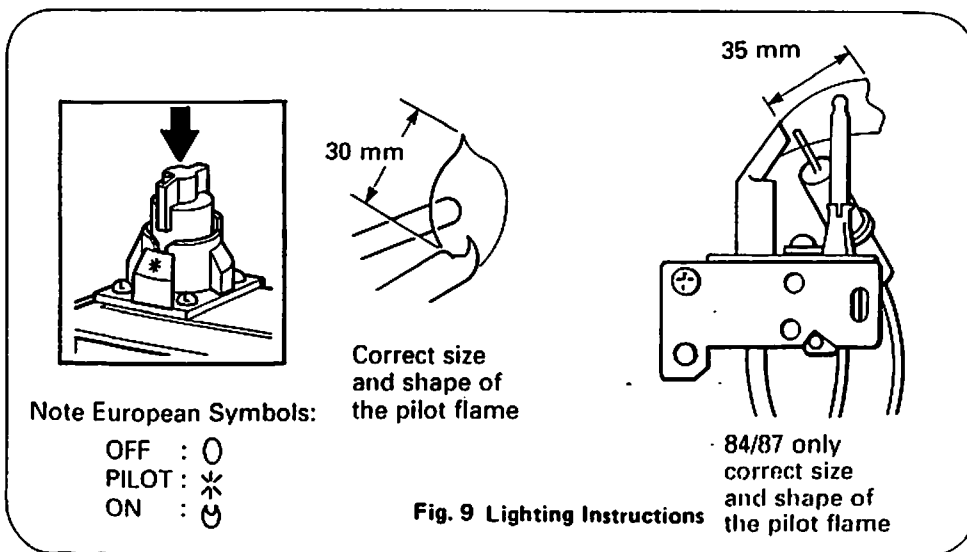
CAUTION: DO NOT OPERATE THE WATER HEATER UNTIL THE STORAGE VESSEL IS COMPLETELY FILLED WITH WATER, WITH WATER RUNNING FROM ALL HOT TAPS.

Open the main gas supply cock after all connections to the gas control thermostat are complete, and test all connections with soap solution.

To Light the Burner

1. Remove outer cover and slide the inner cover to the right (63 and 84 gallon units, raise the inspection port cover), wait 3 minutes for any unburnt gas to vent.)
2. Turn the gas control knob to pilot. (see below)
3. Fully depress the gas control knob and the piezo ignitor. With the pilot burner alight, hold the gas control knob for 20 seconds. When the gas control knob is released the pilot should remain lit, if not repeat the operation.
4. Slide the inner cover to the left (63 and 84 gallon units, lower the inspection port cover). Replace the outer cover.
5. Set the temperature indication dial to the required temperature. (see below)
6. Turn the gas control knob to ON, the burner should now light, if not repeat the operation. (see below)

Thermostat Setting	0		1		2		3	
Approx. Water Temperature	104°F	40°C	125°F	52°C	143°F	62°C	159°F	71°C



Water Treatment

Where extreme conditions of water hardness exist scale can form in any water heating equipment, especially, when the equipment is working under conditions of constant heavy demand, at high temperatures.

This problem can be minimised by reducing the water temperature in the heater and by fitting suitable water pre-treatment plant.

If doubt exists contact a water treatment specialist or the manufacturer for further advice.

In areas where the water supply has a low conductivity a correx powered anode should be fitted. Contact the manufacturer for further information.

E. Multiple Installations

Two or more heaters may be connected in parallel to increase the capacity of the system. Install as Figs. 4 or 7 ensuring that the pipe lengths are equal to maintain a balanced system.

NOTE:

If the heater is out of use during a period of heavy frost and is likely to be in an exposed position it is recommended that the whole system is drained down to prevent damage due to formation of ice inside the storage vessel.

F. Gas Connections

THE APPLIANCE MUST ONLY BE USED WITH NATURAL GAS.

The installation of the gas supply should conform to the requirements of IM/16 published by British Gas p.l.c. or BS 6891. Jointing compound used must conform to BS 6956 Pt5.

CAUTION - DO NOT APPLY HEAT IN CLOSE PROXIMITY TO THE GAS CONTROL THERMOSTAT AS THIS WILL RESULT IN DAMAGE OCCURRING TO THE CONTROL.

Fit the 1/2" gas supply cock immediately upstream of the gas control thermostat and connect to the gas supply. Pressure test the gas installation for soundness. If any doubt exists as to size of gas supply pipe, consult your local Gas Region.

It should be noted that a pressure test point is fitted on the Gas Control Valve at the gas inlet (see fig. 11 page 24).

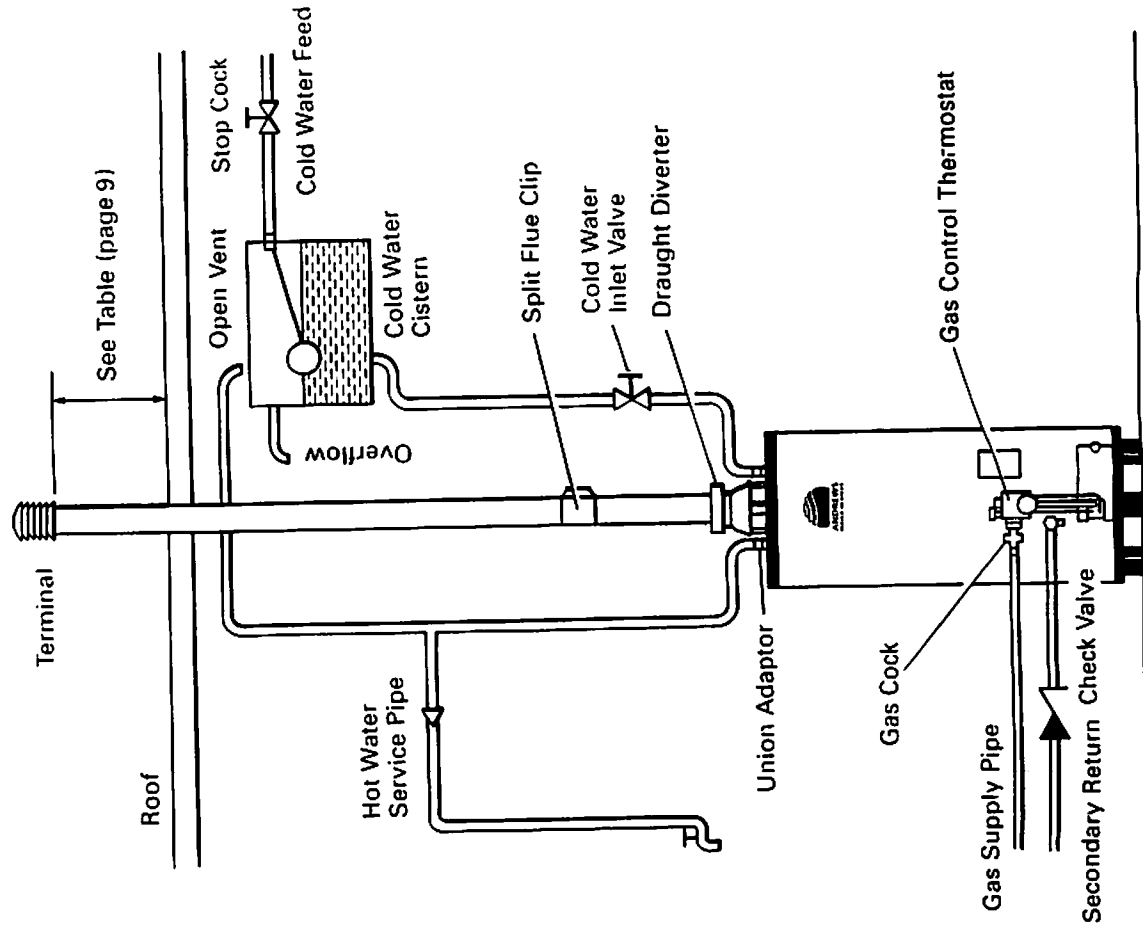
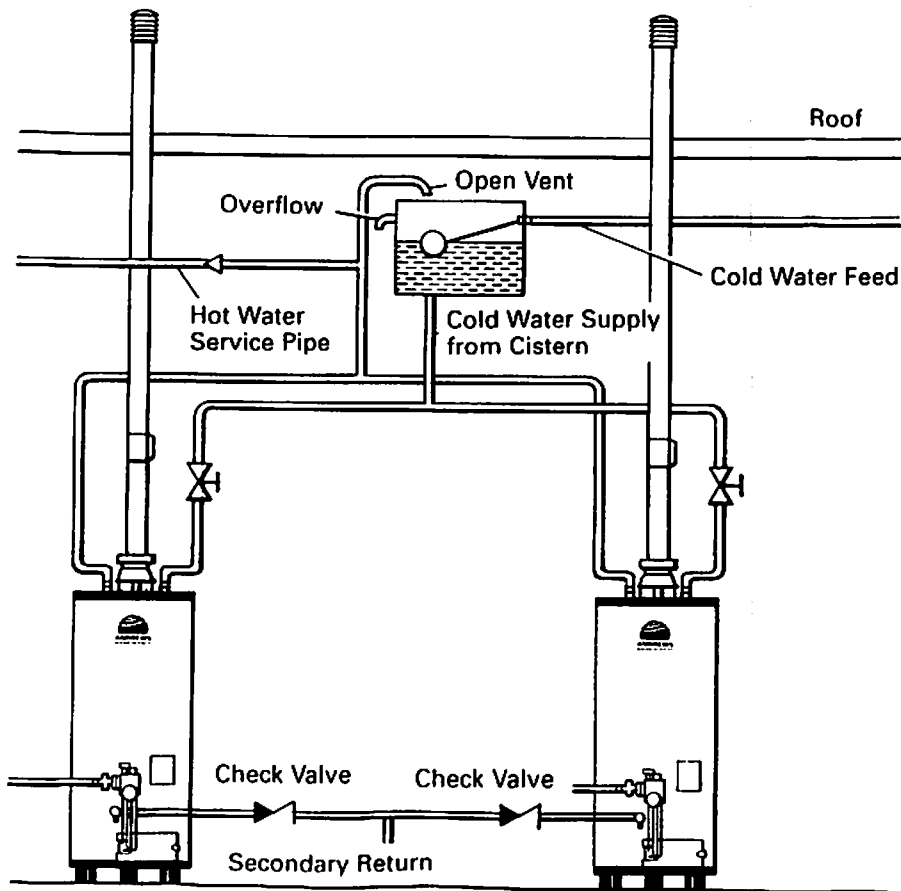


Fig. 3 Typical Single Installation - Vented System



N.B. In all multiple installations exact balance is essential for proper operation. The pipe length from the common tees to the heater connections must be equal.

Fig. 4 Typical Multiple Installation - Vented System

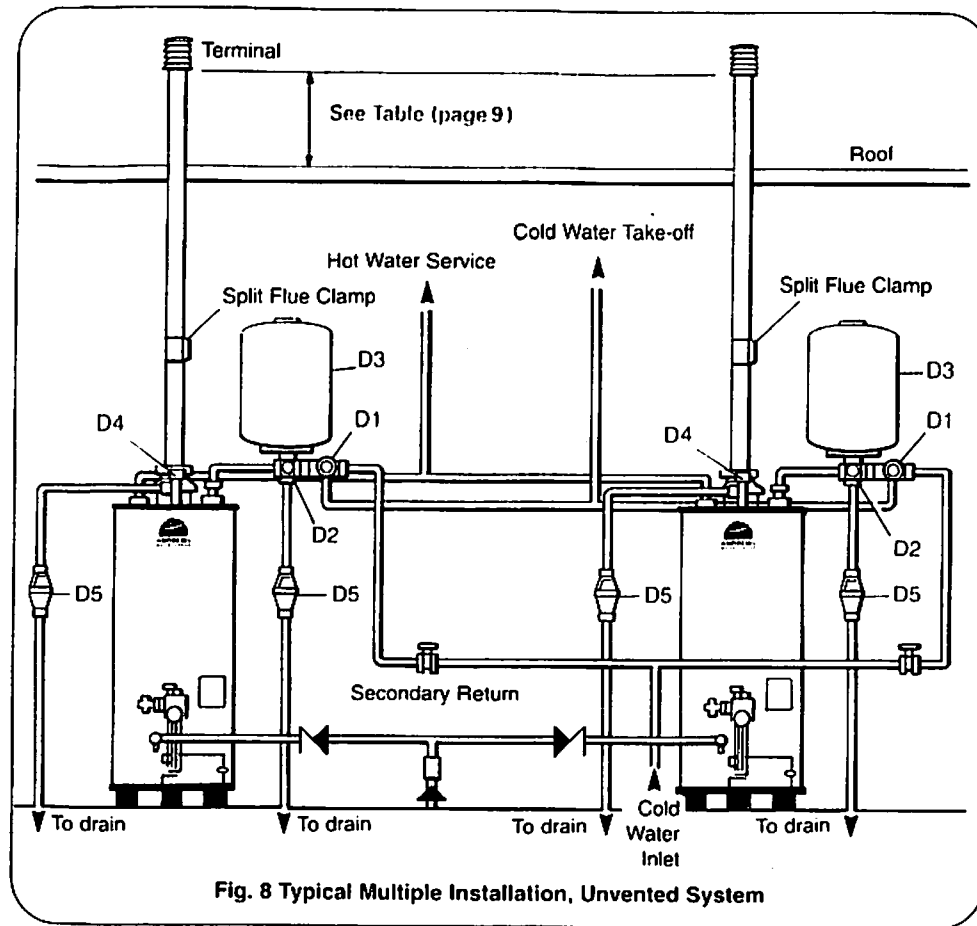


Fig. 8 Typical Multiple Installation, Unvented System

Pipework Dead Legs

Dead legs to water draw off points should be as short as possible. In a system which does not incorporate a secondary return the maximum length of a pipe supplying a draw off tap should be as indicated below.

- Pipes not exceeding 19mm inside diameter - maximum length = 12 metres
- Pipes exceeding 19mm but not exceeding 25mm inside diameter - maximum length = 7.6 metres
- Pipes exceeding 25mm inside diameter - maximum length = 0.9 metres

These pipework lengths also apply to branch pipes from a secondary circuit but which are not incorporated in the circuit.

Pipes should be measured, along the axis, from the water heater, cylinder, tank or secondary circuit.

Where pipes of differing diameters are used the dead leg length must be sized to the largest diameter.

For dead legs to spray taps the maximum length is 0.9 metre.

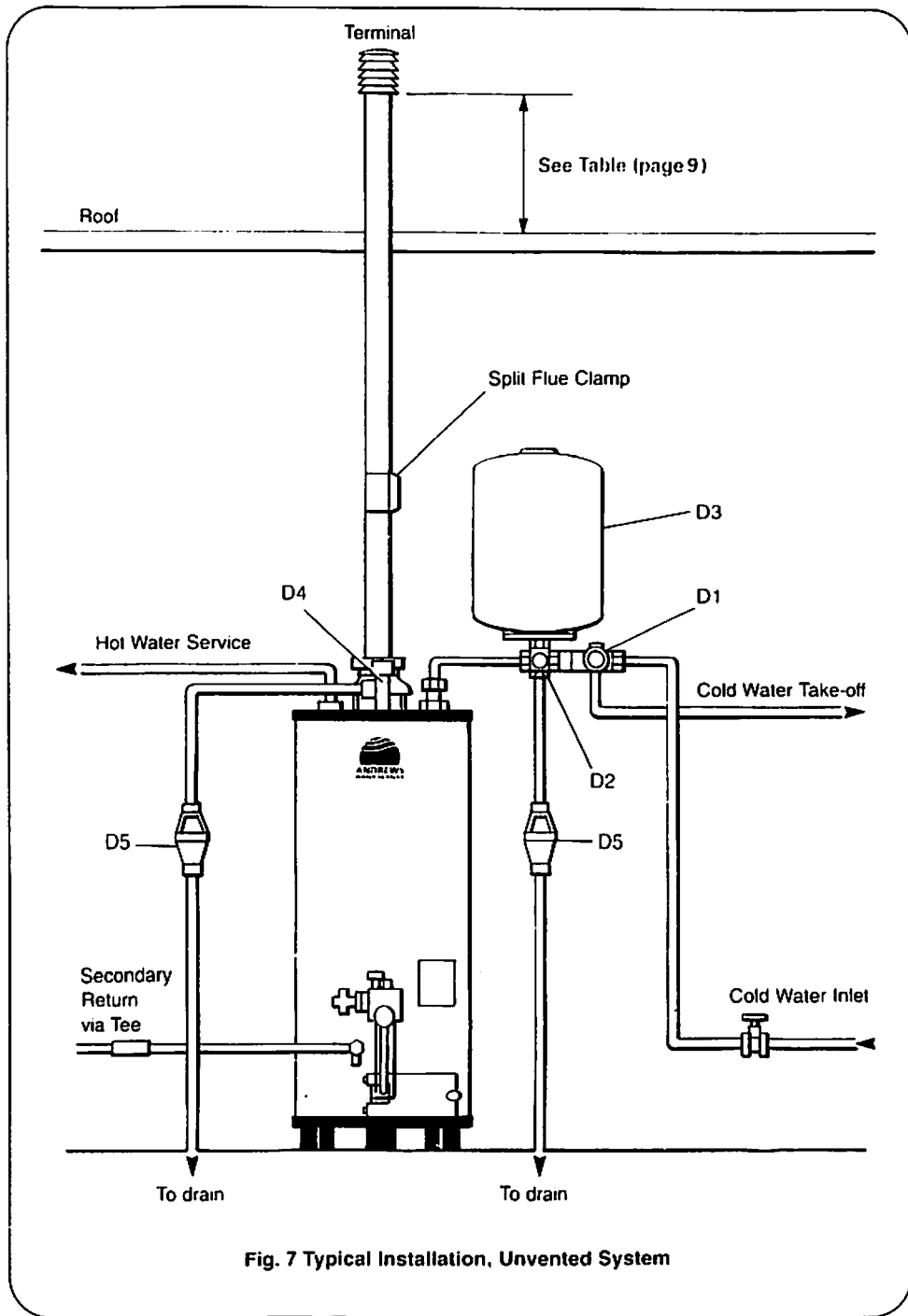


Fig. 7 Typical Installation, Unvented System

Water Connections - Unvented Systems

When used in an unvented system, the Andrews storage water heater will supply hot water at a pressure of 3.5 bar (50.8 psi) providing this pressure is available at the mains feed. During conditions of no flow, whilst the burner is operating, the pressure of the system may rise to a maximum of 6 bar (87.0 psi).

When testing the system it is recommended that a maximum test pressure of 8.62bar (125 psi) be employed.

The Andrews range of storage water heaters can be used on unvented hot storage water systems with the addition, to the standard heater, of an "Unvented Systems Kit" Part No. B171 obtainable from the Andrews Water Heaters.

All fittings and materials must be suitable for use with drinking water and listed in the current Water Research Centre "Materials and Fittings Directory".

Installation of unvented hot storage water systems must comply with Part G of Schedule 1 to the Building Regulations 1991.

Fig. 5, p16 lists and illustrates the component parts of the Unvented Systems Kit. Fig. 6, p17 illustrates the general arrangement of the components. The Wall Mounting Kit is available as an optional extra.

Item D4 must be fitted into the Temperature Relief port (see Fig. 1, p2).

When assembling items D1 and D2 care must be taken to ensure that the flow arrows marked on the components are pointing in the direction of flow i.e. towards the water heater.

The cold water for services may be drawn from the 22mm compression port on item D1(a). The water pressure at this point will be similar to that available at the hot water outlet of the water heater. If port (a) is not used it should be sealed with the blanking plug supplied.

If higher flow rates are required for the cold water services a suitable "tee" fitting should be included in the pipework upstream if item D1.

The pipework fitted to both tundish outlets should be at least 28mm diameter and should be terminated at a suitable drain (see Building Regulations 1991, Approved Document G3).

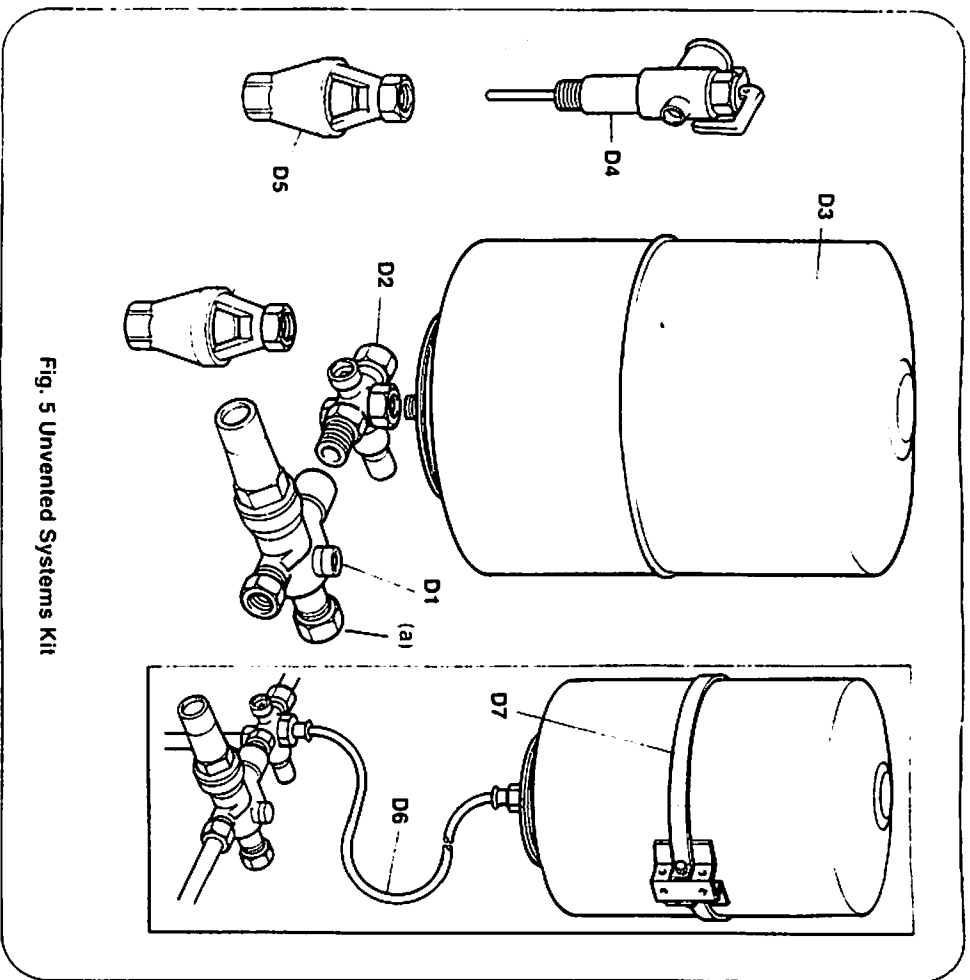
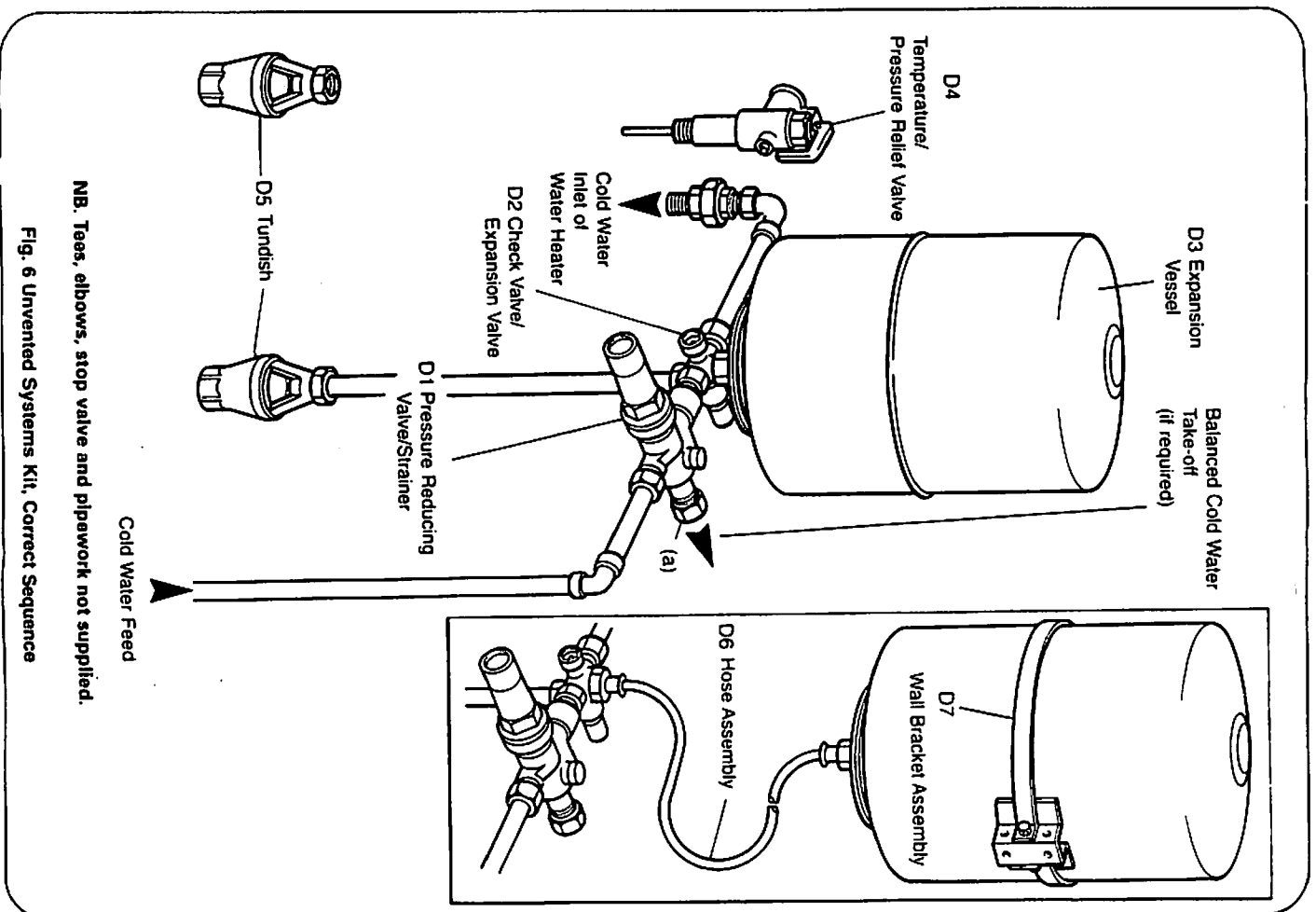


Fig. 5 Unvented Systems Kit

Ref	Part No.	Description	Qty
	B171	Unvented Systems Kit - Complete	
		Components	
D1	C780	Pressure Reducing Valve/Strainer	1
D2	C781	Check Valve/Expansion Valve	1
D3	C782	Expansion Vessel	1
D4	C456	Temperature/Pressure Relief Valve	1
D5	C783	Tundish	2
	B173	Wall Mounting Kit for Expansion Vessel	
		Components	
D6	C788	Hose Assembly	1
D7	C787	Wall Bracket Assembly	1



NB. Tees, elbows, stop valve and pipework not supplied.

Fig. 6 Unvented Systems Kit, Correct Sequence