



GSW WATER HEATING COMPANY

599 HILL ST. WEST, FERGUS, ONTARIO N1M 2X1
CANADA



"SUPERFLUE"®

POWER VENTED GAS FIRED WATER HEATER INSTALLATION AND OPERATING INSTRUCTIONS

Read these instructions

WARNING: If the information in these instructions is not followed exactly, fire, explosion, carbon monoxide poisoning, or other hazardous conditions may result. Improper installation, operation, or maintenance can result in property damage, personal injury, or death.

Refer to this manual. For assistance or additional information, consult a qualified installer, service agency, or the gas supplier. Do not try to light any appliance.

- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.



thoroughly before starting

TABLE OF CONTENTS

I) Introduction	2
II) Air Requirement.....	4
III) Venting	7
IV) Water Piping.....	10
V) Gas Piping	10
VI) First Lighting.....	11
VII) Service And Maintenance	14
VIII) Combo Heating.....	16
IX) Troubleshooting.....	18
X) Warranty.....	19

*This Manual Applies to Electronic Ignition Power Vented Water Heater
Check The Specific Venting Label On The Water Heater For Details*

PLEASE RETAIN THESE INSTRUCTIONS IN A SAFE LOCATION FOR FUTURE REFERENCE

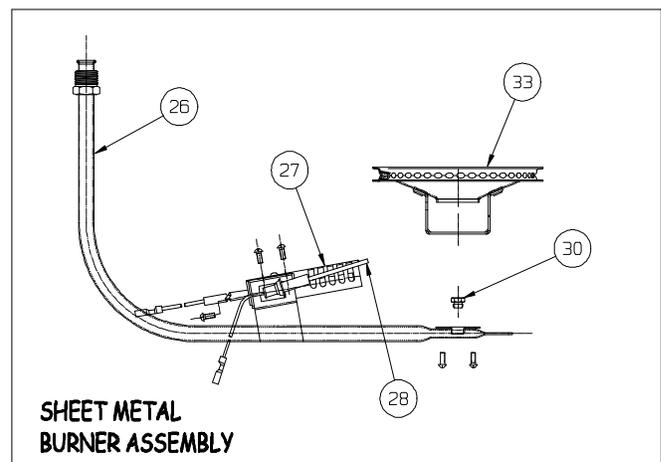
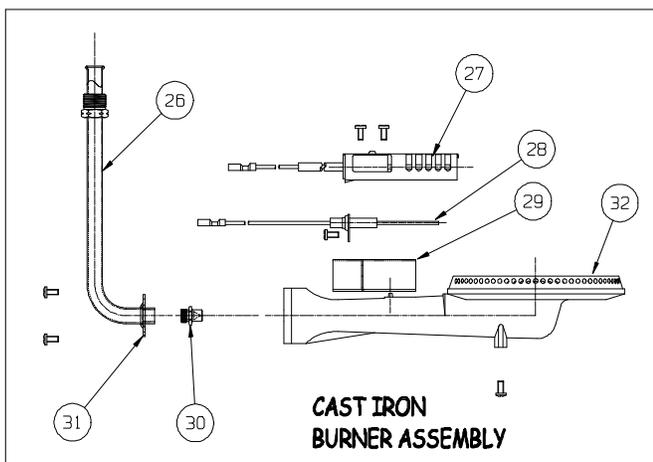
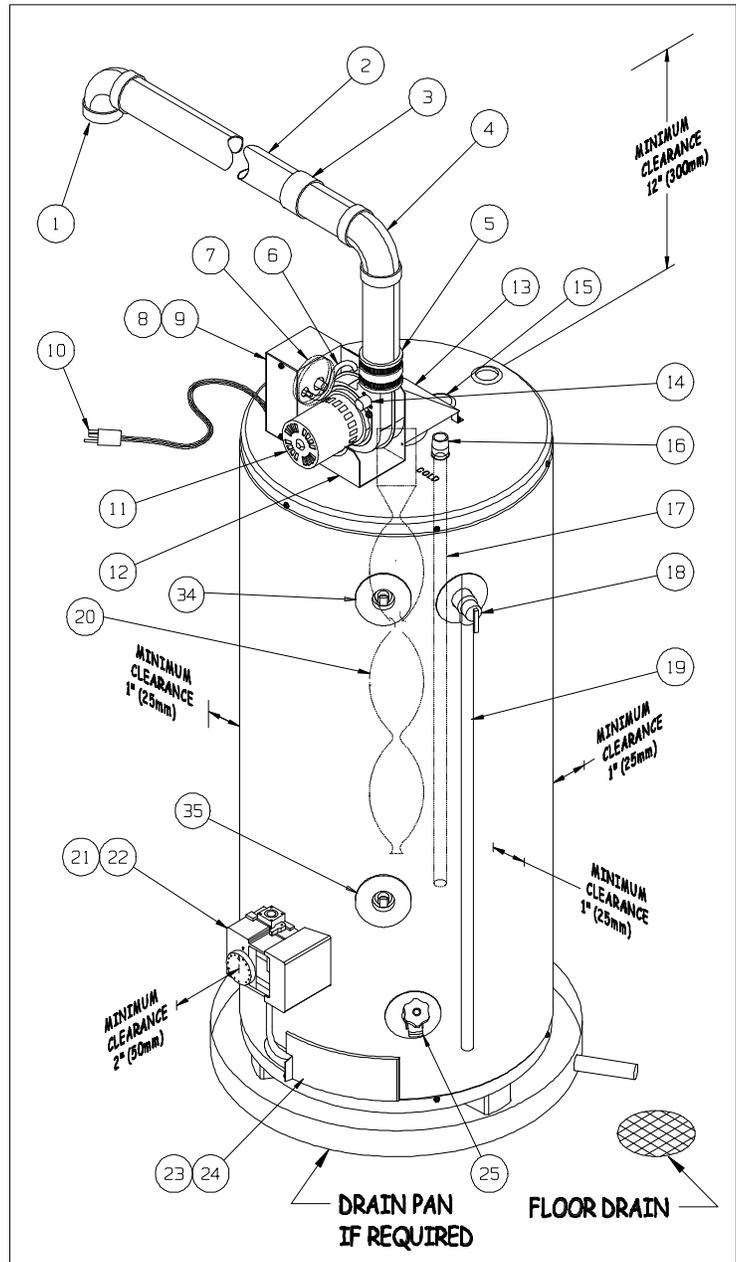
PART NO. 50000 REV. ★ (FF-06-99)



REPLACEMENT PARTS LISTING / CLEARANCE TO COMBUSTIBLES

1. TERMINATION ELBOW *
2. PIPE LENGTH *
3. PIPE COUPLING *
4. PIPE ELBOW 90° *
5. RUBBER COUPLING
6. AIR TUBING
7. AIR SWITCH
8. JUNCTION BOX
9. JUNCTION BOX COVER
10. POWER CORD
11. BLOWER
12. BLOWER SUPPORT BRACKET
13. DRAFT DIVERTER
14. HIGH LIMIT SWITCH
15. ANODE (UNDER CAP)
16. NIPPLE
17. DIPTUBE
18. T&P VALVE
19. DRIP TUBE
20. BAFFLE ASSEMBLY
21. CONTROL VALVE (WHC)
22. CONTROL VALVE COVER (WHC)
23. INNER GAS DOOR
24. OUTER GAS DOOR
25. DRAIN VALVE
26. FLARE TUBE (GAS SUPPLY)
27. IGNITER ASSEMBLY
28. FLAME SENSOR
29. IGNITER BRACKET
30. ORIFICE
31. AIR SHUTTER
32. CAST IRON BURNER
33. SHEET METAL BURNER
34. HEATING SYSTEM SUPPLY (optional)
35. HEATING SYSTEM RETURN (optional)

* OWNER SUPPLIED



I) Introduction

We thank you for choosing a GSW/ John Wood Water Heater. Your satisfaction with this product is very important to us.

This gas-fired water heater has been developed to produce potable hot water and may also be used in combination with space heating applications. The "Superflue"[™] series is designed to vent the products of combustion (flue gases) horizontally through an exterior wall or vertically through the roof using an integrated blower assembly and plastic piping, without the need for a conventional chimney.

Important Consumer Notice



These instructions have been written for the proper installation, safe operation and maintenance of this water heater.

It is your responsibility to ensure that your water heater is properly installed and cared for. ***FAILURE TO FOLLOW THE INSTRUCTIONS IN THIS MANUAL MAY RESULT IN SERIOUS BODILY INJURY AND /OR PROPERTY DAMAGE. THOROUGHLY READ ALL INSTRUCTIONS*** before you attempt to install or operate this heater.

Installation and service require trade knowledge in the area of plumbing, electricity, venting, air supply and gas supply. If you lack these skills or do not understand these instructions, enlist the help of a qualified professional.

GSW Water Heating Company, the manufacturer of this water heater, cannot be held liable for those damages caused by improper installation, sizing or failure to comply with these instructions.

Approvals

This water heater has been certified for operation using natural gas or propane gas fuel by the Canadian Gas Association (CGA) and design-certified by the American Gas Association Laboratories (AGA) through International Approval Services Inc. This heater is approved to provide potable hot water or when combined with a suitably-sized fan coil, baseboard heater, etc., to provide both space heating and domestic hot water.

Installation Code Requirements

Canadian Installations

In addition to the installation instructions found in this manual, the heater shall be installed in accordance with the latest edition of CAN/CGA B149.1, B149.2 installation codes and/or any local codes. These shall be carefully followed in all cases. Authorities having jurisdiction shall be consulted before installations are made.

All electrical connections shall be in accordance with the latest edition of the Canadian Electrical Code CSA C22-1 Part 1.

U.S. Installations

In addition to the installation instructions found in this manual, the heater shall be installed in accordance with the latest edition of the National Fuel Code ANSI Z223-1 (NFPA 54) and/or any local codes. These shall be carefully followed in all cases. Authorities having jurisdiction shall be consulted before installations are made.

Important: All supply equipment, installation, Approvals, permits, inspections, etc. are the responsibility of the owner of this water heater. Consult your local authorities for regulations specific to your area.

Relief Valves (T&P)

All heaters must be installed with a proper temperature and pressure relief valve. These valves must be certified as meeting the requirements for Relief Valves and Automatic Gas Shut-Off Devices for Hot Water Supply Systems, ANSI Z21-22 in the United States. When in Canada, the Standard for Temperature, Pressure, Temperature and Pressure Relief and Vacuum Relief CAN 4-4 is required.

Backflow Prevention

Certain jurisdictions may require the installation of a backflow device (e.g., check valve) in the water supply line. Such a device will require the use of a system expansion tank of adequate size to control the thermal expansion generated during the heating cycle. Consult your water supplier or local plumbing authority.

Important: The supply water meter may have a built-in check valve device. Contact your local water authority.

Safety Warnings



- Water Heaters are heat-producing appliances. To avoid damage or injury, no materials shall be stored against the heater and provision shall be made to prevent unauthorized contact (e.g. children).

FOR YOUR SAFETY, DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE, COMBUSTIBLE OR CORROSIVE VAPORS OR LIQUIDS IN THE VICINITY OF THIS HEATER OR ANY OTHER APPLIANCE.

- Hot water produced by this appliance can cause severe burns due to scalding. The hazard is increased for young children,

the aged, or the disabled where water temperatures exceed 125° F (52°C).

Use anti-scald valves in the hot water system to reduce the risk of scalding at points of use such as lavatories, sinks and bathing facilities. Such precautions must be followed when this heater is operated in combination with dishwashing or space heating applications.

- As with all fuel burning equipment, this heater requires an adequate supply of air for combustion and ventilation. An insufficient air supply can result in poor combustion or the recirculation of the exhaust flue gases. Such a condition can cause sooting or present a fire hazard, which may result in serious bodily harm or death from asphyxiation.

MAKE SURE THE FLOW OF COMBUSTION AND VENTILATION AIR IS NOT RESTRICTED.

- If this water heater has been exposed to flooding, freezing, fire or any unusual condition, do not put it into operation until it has been inspected and approved by a qualified professional. **THESE CONDITIONS CAN RESULT IN UNSEEN INTERNAL DAMAGE** and are not subject to warranty coverage.

Safety Warnings

- There is a risk in using fuel-burning appliances such as water heaters. Areas that may not be suitable for water heater installation include those where flammable liquids, gasoline, solvents, adhesives, etc., or engine-driven equipment or vehicles are stored, operated or repaired. Due to the nature of air movement, flammable vapors can be carried some distance from the point of storage. The gas-fired water heater, pilot or main burner flame can ignite these vapors causing a flashback fire or explosion which may result in serious personal injury or death, as well as severe property damage.

If installation in a garage or shed is the only option, it is recommended that the water heater be elevated a minimum of 18" (45 cm) above the floor level. This may reduce **BUT NOT ELIMINATE** the risk of flammable vapors being ignited. Such installations must be protected from impact or physical damage caused from moving equipment or vehicles.

CHECK LOCAL CODES!

- Exposure to air borne chemicals can cause severe corrosion to the water heater and damage to the venting parts. Air containing vapors from cleaning solvents, pool chemicals, refrigerator or air conditioning refrigerants, laundry detergents or bleaches, waxes, spray can propellants, dry cleaning, photo processing liquids, calcium and sodium chloride

(softener salt) or other process chemicals are typical of compounds which are potentially corrosive.

- Products of this type should not be stored near the heater. Air containing these chemicals should not be used as supply to the heater. If necessary, uncontaminated air shall be obtained from remote or outside sources.
- ***HYDROGEN GAS CAN BE PRODUCED IN A HOT WATER SYSTEM. THIS CAN BE PROBLEMATIC IN SYSTEMS WITH LONG STANDBY PERIODS. HYDROGEN GAS IS EXTREMELY FLAMMABLE*** To reduce the risk of injury under these conditions, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will probably be an unusual sound, such as air escaping through the pipe as the water begins to flow. **THERE SHOULD BE NO SMOKING, OR OPEN FLAME NEAR THE FAUCET AT THE TIME THAT IT IS OPEN.**

INSTALLATION INSTRUCTIONS

NOTICE

Before installing this water heater consideration and planning must be given to the following details:

- Heater location. The vent blower can create air noise. Do not install near sleeping area, in a bedroom or bathroom;
- Location of the outside vent terminal; See "Venting" p. 7.
- Routing and support of the vent piping; Figure 5 page 8.
- How and where to obtain combustion and ventilation air supply; See "Air Requirements" page 4.
- Position of water supply and placement of water piping for hot and cold water; See "Water Connections" page 10.
- Access for gas supply, electrical power, floor drain and service. See "Gas Service" pages 10 and 11.

NOTICE

REVIEW SAFETY WARNINGS FOUND IN THE FRONT OF THIS MANUAL BEFORE PROCEEDING.

Location and Clearances

Locate the water heater such that all controls are easily accessible. We recommend that 24" (0.6 m) in front of the heater and 34" (0.9 m) above be maintained for serviceability. Ensure that the water heater is level. See Figure 1. Page 1. and Figure 2 page 4.

This heater is designed to safely operate with the following minimum clearances to combustibles.

**Front 2" (50 mm) Sides and Rear 1" (25 mm)
Top 12" (305 mm) Plastic Vent Piping 0" (0.0 mm)**

Locate near a floor drain and in an area where leakage of the tank or water piping will not result in damaging adjacent areas or lower floors of the structure. Where such a location is not available, a suitable drain pan must be installed under this water heater. This pan shall be 1½ " (40 mm) deep and a diameter that is a minimum of 2" (50 mm) greater than the diameter of the water heater. A suitable pipe properly connected to an adjacent floor drain shall be provided.

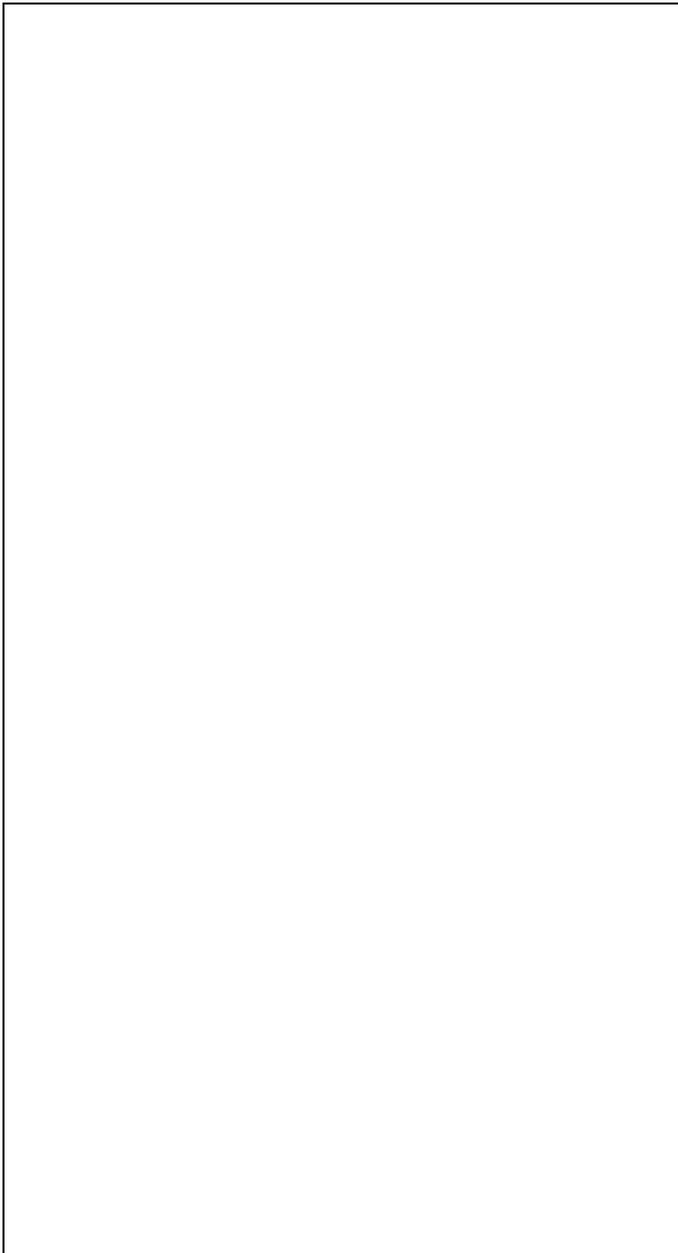
This heater may be installed in a closet or alcove and is certified for operation on a combustible floor.

WARNING



Do not install directly on carpet. Instead, place the water heater on a metal or wood panel extending a minimum of 3" (75 mm) from all sides. In alcoves or closets, cover the carpet completely. Ensure that this panel is capable of supporting the weight of this heater when filled with water.

FAILURE TO PROPERLY INSTALL THIS HEATER MAY RESULT IN A FIRE HAZARD.



II) AIR REQUIREMENTS

General.

- **An adequate air supply shall be provided for combustion and ventilation of this water heater. An insufficient supply can result in poor combustion and possible sooting of the burner, combustion chamber or flue passageway. This may present a potential fire hazard or could create a serious health hazard by producing carbon monoxide.**

Where an exhaust fan or any other air consuming appliance (Eg. Clothes dryer, furnace, etc.) is installed in the same space as the water heater, sufficient air openings must be available to provide fresh air when all appliances are operating simultaneously.

The area in which the heater is located is classified as either "an unconfined space" or "a confined space."

An unconfined space is defined as a space having a volume **not** less than 50 cubic feet per 1000 BTU/hour (4.8 cubic meters per kilowatt) of *combined input rating* of all appliances using the space. Adjacent open rooms may be included as part of the unconfined space. **There shall be no closeable doors between these rooms.** An example of this is an open basement.

A confined space is one smaller than described above. Air shall be supplied through permanent openings as described in Figures 3 and 4. At no time shall an air opening have a dimension of less than 3" (75 mm) and at no time shall any top opening be lower than the top of the water heater.

For buildings that are not well sealed (do not have tight fitting doors and windows) natural air infiltration may provide sufficient air required for combustion and ventilation. For buildings using tight construction (newer and renovated structures), the air supply shall be introduced from the outdoors, regardless of whether the space is confined or unconfined.

Combustion Air "Supply" Ducts

Air supply ducts shall be of galvanized steel or equivalent corrosion resistant material. A single air duct may not be substituted when required for upper and lower air openings.

Horizontal upper combustion air ducts shall not slope downward toward the air inlet.

Louvers and Grills

Openings for air supply ducts must provide free unobstructed air movement. Louver and grill openings must be sized to ensure that the **FREE OPEN AREA** is never less than the area of the air duct.

Air Requirements for Canadian Installations

Canadian Codes allow for the use of a single air supply source. Canadian customers and authorities having jurisdiction may use the sizing listed in Table 1. Check Local Codes.

When using a single air supply, the duct shall terminate within 1 foot (30 cm) above and within 2 feet (60 cm) horizontally from the burner level of the appliance having the largest input as shown in Figure 3 (b), (c) and (d).

An opening shall be located neither more than 18 inches (450 mm), nor less than 6 inches (150 mm), above floor level. See Figure 3 (b), (c) and (d).

Two permanent openings shall be provided connecting the confined space (e.g., closet/small room) with the unconfined space. Each opening shall have a free area of one square inch per 1,000 BTU/hour input (5.5 cm²/kW) of all appliances in the confined space. The top opening shall commence within 12" (30 cm) of the top of space and the bottom opening shall commence within 12" (30 cm) of the bottom of the enclosure. See Figure 3 (a).

All exterior vent openings are to be clear of snow levels.

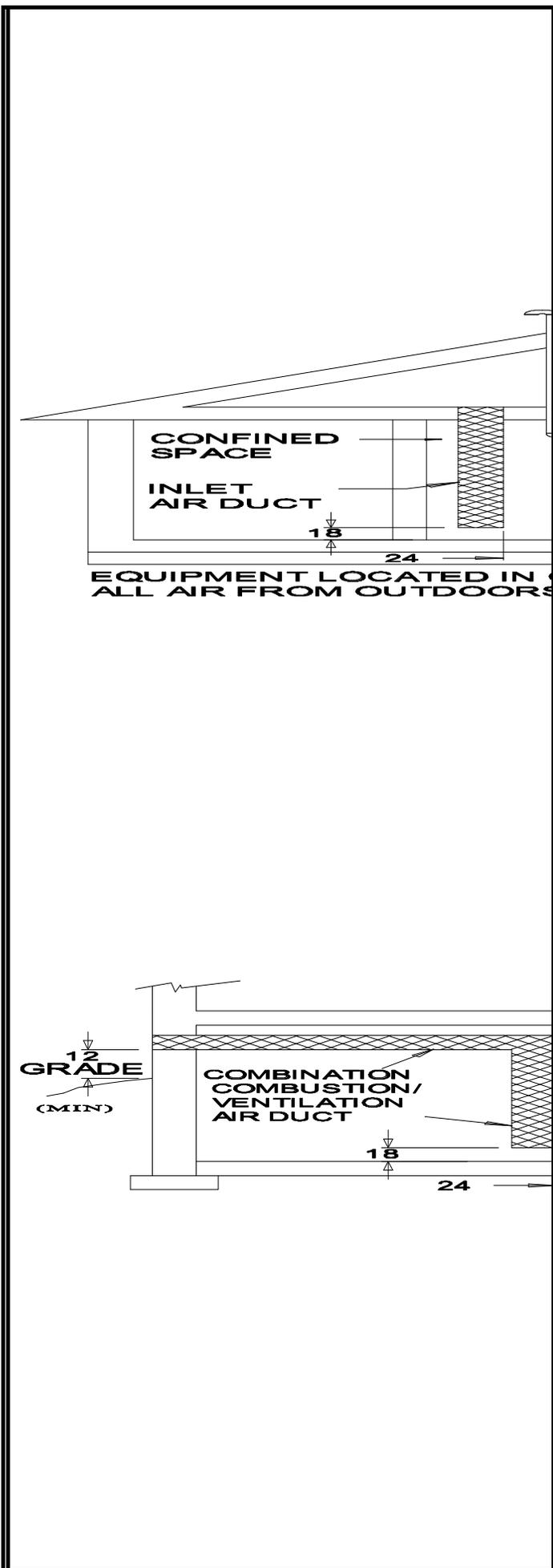
Table 1

Combined Input of All Appliances in Confined Space*		Required Free Area		Acceptable Round Duct Size Diameter			
				A ¹		B ²	
BTU/hr	(KW/hr)	ln. ²	cm ²	ln.	mm	ln.	mm
25,000	(8)	7(45)		3(75)		4(100)	
50,000	(15)	7(45)		3(75)		4(100)	
75,000	(23)	11(70)		4(100)		5(125)	
100,000	(30)	14(90)		4(100)		5(125)	
125,000	(37)	18(120)		5(125)		6(150)	
150,000	(45)	22(140)		5(125)		6(150)	

1 Maximum length of ducts in column A is 20 equivalent feet (6.1 meters)

2 Maximum length of ducts in column B is 50 equivalent feet (15.2 meters)

* All appliances refers to and includes those appliances using the same air source. e.g. Water heater, furnace, boiler, clothe dryer, etc.



III) EXHAUST VENTING

IMPORTANT: READ THIS SECTION BEFORE PROCEEDING.

The Superflue™ series is designed to exhaust the products of combustion to the outdoors using a sealed vent pipe system. Required materials and vent sizing are described in Table 2. Refer to figure 6 to determine the exhaust vent termination position.

Plan the layout from the vent terminal back to the water heater. Take into consideration piping position, elbows and support.

Venting Instructions

1. Refer to Figure 5 and Table 2 for vent pipe materials and sizing.
 - Use 45° elbows wherever possible.
 - Do not use 90° “back to back” elbows and do not use street elbows. Maintain 6" (150 mm) of straight section between elbows.
 - Calculate “Equivalent Vent Length” before starting. Do not exceed the values shown in Table 2. Example: The water heater is located 12 feet (4 meters) from the desired termination point. To reach this, you determine that you need (3) 90° elbows plus about 15 feet (5 meters) of 2" (50 mm) straight section. From Table 2, it is seen that each 2" elbow = 5 equivalent feet (1.5 meters) Therefore this example uses 30 equivalent feet.
 - *Important:* When using long runs of vent or when passing through cold or unheated areas condensation of the gases can develop. Provision must be made for a condensate trap or drainage.
2. Measure vent piping and cut to required lengths, Pipes shall be cut at right angles and deburred to ensure a good fit.

3. Dry fit all vent pipes, elbows and fittings before joining any parts with solvent cement. Use only the recommended adhesive for ABS, PVC or CPVC, depending on your installation. **PARTS MUST FIT WITHOUT STRESS OR BENDING OF ANY SECTION**, and each connection must overlap a minimum of ½" (15 mm). **Caution:** solvent cements for plastic piping are flammable. Use only in well ventilated areas and keep away from all sources of ignition.

4. Support the vent piping every 4 feet (1.2 meters) to prevent stress or sagging. **DO NOT USE AN ELBOW AS A SUPPORT POINT.** Elbows are not designed to carry the weight of the venting system. Use appropriate support straps and vibration isolators on a straight section. **IMPROPERLY SUPPORTED VENTING CAN POSE A SAFETY HAZARD.**

5. For long runs of venting, or when passing through cold or unheated areas, condensation can develop. Slope vent pipe to drain through termination outlet. If vertical runs are used, a condensate drain should be provided.
6. At the point where the vent pipe exits the building, drill a 2½" (65 mm) hole for 2" (50 mm) venting or a 3¾" (95 mm) hole for 3" (75 mm) venting). See Figure 5.

CAUTION: BEWARE OF ANY CONCEALED WIRING OR PIPING INSIDE THE WALL.

7. Insert the vent pipe through this hole and secure into position. Connect the vent pipe terminal elbow as shown in Figure 5. Seal around the vent pipe with caulking or silicone once the position is finalized. Ensure that the Debris/Rodent Screen is properly installed.

Power Vent Connection

1. The plastic vent piping connects into the rubber coupling on the blower assembly. See Figure 7. Lightly sand the end of the vent pipe to roughen the outside surface to provide a good mechanical connection with the rubber coupling.
2. Loosen the top clamp on the coupling and insert the end of the vent pipe a full 1¼ " (35 mm). Check that there is no stress in the vent pipe system caused by twisting or bending. **Do not use glue or sealant at this connection.**
3. Tighten top clamp so that the vent pipe is firmly secured in the coupling and is gas tight. Do not over-tighten or cause distortion of the parts.
4. Check that the bottom of the coupling is firmly seated on the blower outlet and that the bottom clamp is also secure.

Ensure that there is no movement of the clamped assembly once it is completed.

IV) Water Pipe Connections

Water piping and fittings should be installed as shown in Figure 8.

1. Close main water supply and drain the piping system where water heater is to be connected.
2. Water heater "inlet" and "outlet" are identified in the top cover (see figure 8).
3. When attaching solder (sweat) fittings, **DO NOT APPLY HEAT DIRECTLY TO THE WATER HEATER NIPPLES** or the plastic liners will be damaged. Sweat adapters to the first section of the water piping before threading onto the water heater.
4. Install a manual shut-off valve in the cold water supply line. It is good plumbing practice to include unions at the hot and cold connections as shown. (Fig. 8)
5. **IMPORTANT:** Before putting the water heater into service, make sure that a properly rated and sized temperature and pressure relief valve is installed in the designated fitting in the water heater. The relief pressure marked on the relief valve must not exceed that stated on the rating plate of the water heater.

IMPORTANT: The relief valve must be connected to a discharge or drain pipe no smaller in size than the outlet of the relief valve. This pipe must not be valved, plugged, allowed to freeze, or be restricted in any way. Terminate close to a drain of adequate capacity.

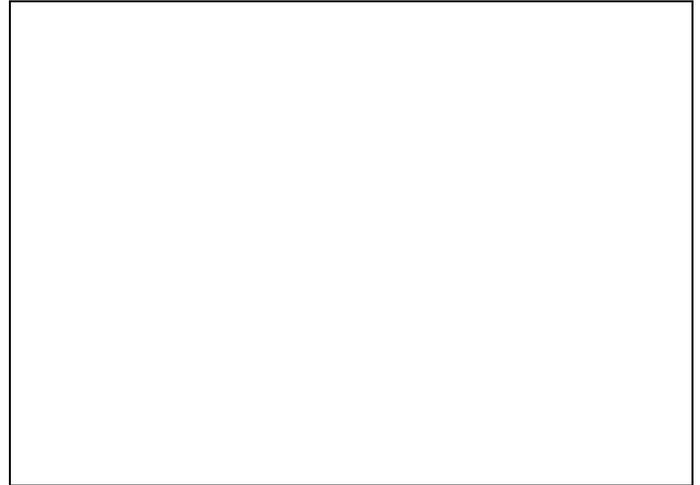
The relief valve is necessary to avoid excessive water pressure or water temperature from developing. Such a condition could cause serious personal injury due to scalding or serious physical damage to the water heater. This safety device shall be checked annually for proper operation.

Check local Codes.

6. With water piping installed, check that a hot water faucet served by the water heater is open and that the heater drain valve is closed. Open the cold water supply valve and fill the

water heater and piping system with water. When an uninterrupted stream of water flows from the faucet, the system is full. Close faucet. Check for leaks and repair as necessary.

7. Connect a hose to the drain valve and connect to drain. Open drain and let water run until clear to flush out any foreign



matter that may have entered the system. Once flushed, close the drain valve and disconnect hose.

V) Gas Service

Gas piping and fitting shall be installed as shown in Figure 9. Check that a properly sized gas meter and regulator are available to service the water heater. If other appliances are using the same meter and regulator, ensure that the capacity of the meter and regulator matches that of the combined input of all appliances connected to it. The gas control supplied with this water heater is designed for a maximum inlet pressure of 0.5 p.s.i. (14" water column).

WARNING

Exposure to a higher gas supply pressure may cause damage to the control, resulting in explosion or fire. Consult your local gas supplier and gas authorities. **DO NOT PUT INTO SERVICE IF OVER-PRESSURIZATION HAS OCCURRED.**

Use gas piping of adequate sizing to ensure full gas input. All piping must comply with all local codes. In the absence of local codes, piping must comply with the rules stated by the applicable National Fuel Gas Codes. Final connection to the water heater is made using 1/2" N.P.T. pipe.

- A manual gas shut-off valve shall be installed in the gas line near the water heater. A union is recommended for ease of service.
- To trap dirt or foreign material in the gas supply, a dirt (drip) leg shall be installed in the piping.
- Apply joint compound (pipe dope) to the male ends of the threads before joining pipe sections. Use only compounds that are compatible with natural gas and propane fuels. To prevent damage to the gas valve, do not over-tighten.

Purging

Caution: ⚠

Gas line purging is required to eliminate air from the piping system. Purging should be performed by persons experienced in this type of gas service. Do not purge in confined areas or space where ignition may occur. To avoid risk of fire or explosion ensure the area is well-ventilated and all sources of ignition are deactivated. Contact your local gas authority for local requirements.

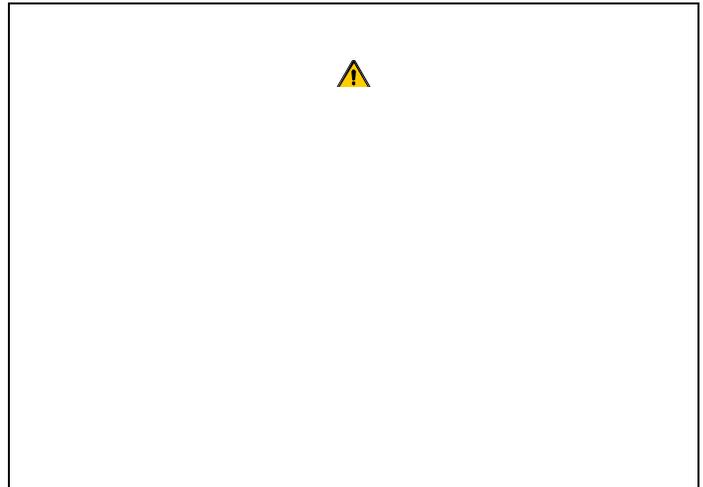
IMPORTANT: Disconnect the water heater from the gas piping during any high pressure testing above 0.5 p.s.i. Perform a leak test at normal gas pressure on all fittings after all connections have been made and the gas has been turned on. Soap test all connections of the gas system - bubbles indicate leaks.

Gas Pressure

GSW Water Heating Company recommends that the gas supply pressure as measured on the inlet side of the water heater control, be set at 7.0 inches water column for natural gas and 11.0 inches water column for propane gas.

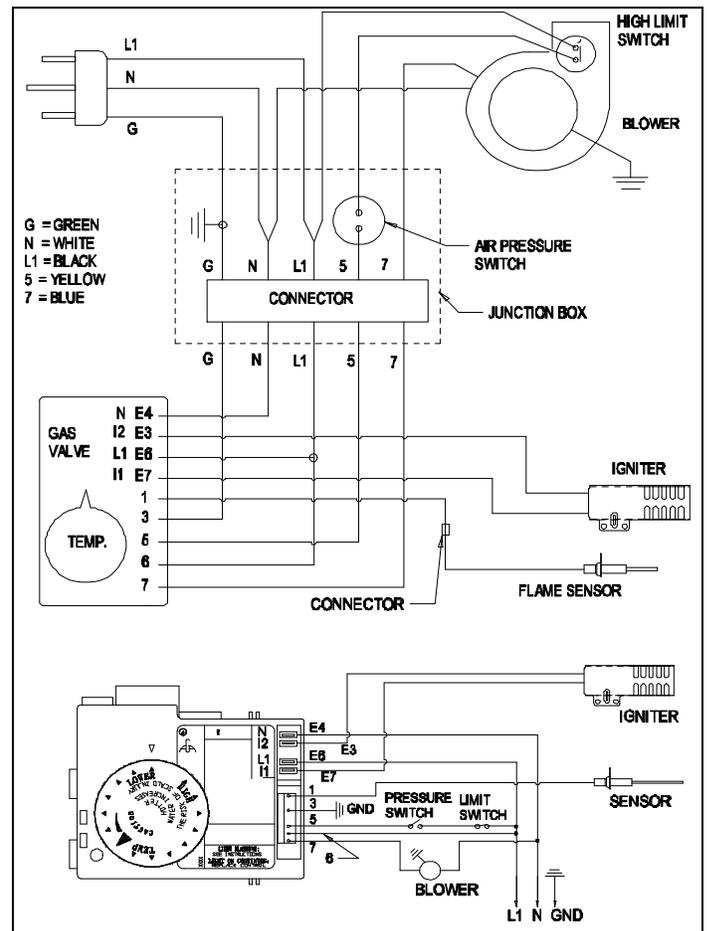
Electrical Supply

A three-wire cord and plug is provided with this water heater. The plug shall be connected into an electrically grounded, 120 VAC, 60 Hz, 12 Amps, fused receptacle. The electrical supply



must meet the minimum provisions as stated in the National Electrical Code for U.S. customers and in the Canadian Electrical Code for Canadian customers.

The electrical controls used inside the thermostat/gas valve mounted on this water heater is polarity sensitive. Ensure that the electrical supply is properly connected in the receptacle box. Failure to connect properly will cause the unit not to function (See Figure 10).



Important: in locations where a sump pump failure, flooding or exposure to water may be present, a ground fault receptacle is recommended.

VI) Lighting and Operating Instructions

WARNING  **READ BEFORE PROCEEDING**

If you do not understand and follow these instructions, a fire or explosion may result.

This Superflue™ Water Heater is equipped with an electric combination thermostat / gas valve control and an ignition device that lights the burner. **DO NOT ATTEMPT TO LIGHT THIS WATER HEATER MANUALLY!** The control contains internal self-diagnostic features and an external LED monitor light (Figure 11).

During operation a flashing LED indicates a burner or ignitor failure, putting the system into a safety lockout condition. This control uses three attempts at ignition before locking out. To reset a system in lockout, disconnect electrical power, wait ten seconds and re-energize. If the system fails to re-start, see trouble shooting section.

A “constant on” LED indicates an unserviceable fault within the control, and cannot be reset. The complete control must be replaced.

Initial Start Up

1. With all gas valves closed and the power cord NOT plugged into an electrical outlet, make sure that the water heater is filled with water and that the cold water supply valve is open.
2. Open the manual shut off valve in the gas supply line and turn the water heater's gas control switch to the "ON" position. Wait for five minutes. Smell around the water heater for any possible gas leak, Check close to the floor and around the burner door area as some gases, especially propane, are heavier than air.

IF YOU SMELL GAS:

- Do not try to operate the water heater or any other appliance.
 - Do not operate any electrical switch; do not use a telephone.
 - Immediately call your gas supplier from a neighbor's telephone. Follow the gas supplier's instructions.
 - If you cannot contact your gas supplier, call the fire department.
3. To start the water heater, set the thermostat to the mid point arrow on the dial (approximately 120°F, 50°C) and plug in the power cord. The system will start automatically.
 4. The gas valve will first do an initial diagnostic to check that it is working properly. Once proven, the control will energize the blower assembly and power through the pressure and high temperature safety switches.
 5. With pressure and temperature safety switches proven, power is sent to the ignition system. The ignitor will glow until it reaches optimum temperature. Full glow takes approximately 15 seconds.
 6. With ignitor proven, the control will open the internal gas valve, allowing gas to flow to the burner. Main flame is established and envelops the flame sensor rod. This rod monitors flame stability. If the flame fails the system will shut down.
 7. The heater will continue to operate until the water temperature reaches the thermostat setting. At that time the burner will shut down, while the blower continues to operate for a brief post-purge sequence.
 8. The water heater will remain off until the water temperature drops sufficiently to reactivate the system or the thermostat is set to a higher requirement.

TURNING WATER HEATER OFF

1. Turn thermostat to its lowest setting.
2. Turn control switch to the "OFF" position.
3. Turn gas supply valve "OFF".
4. If the blower is still running, wait for it to stop.
5. Unplug electrical cord.

Performance Checks

1. Burner Manifold Pressure - The burner operates at a manifold gas pressure of 3.5" W.C. for natural gas and 10.0" W.C. for propane gas. A $\frac{1}{8}$ " N.P.T. port is provided on the gas valve control for connection to a gauge to measure the pressure (See Figure 11). The control valve has an internal pressure regulator. Do not confuse the manifold pressure with the supply inlet pressure. Return port plug upon completion of tests.
2. Checking Input - Never exceed input shown on the rating plate. Ask your gas supplier for the heating value of the gas you are using. Check the input by "clocking" the gas meter. Make sure no other appliances are operating when the test is being done. To ensure accuracy, clock enough gas so that the time is greater than 60 seconds. Use the following formula to check input. Check that your gas pressures are as previously stated.

$$\text{Input (BTU/Hour)} = \frac{\text{Gas Heating Value}^* \times \text{Cubic Feet/Meters clocked}}{\text{Seconds clocked}}$$

*Gas Heating Value in BTU/cubic feet or cubic meters

1 cubic meter = 35.31 cubic feet

3. Checking burner flame - Superflue Water Heaters may use either a sheet metal or cast iron burner. Access the burner by lifting off the outer gas door and sliding open the inner door located at the bottom of the water heater.
 - for water heaters having a sheet metal burner and burning natural gas, a constant, steady, soft blue flame should be visible coming from the burner head
 - for water heaters having a sheet metal burner and burning propane gas, the flame will be a constant, steady blue with a brighter blue being visible right at the burner head. The very ends of the flame may be tipped with yellow. This is more noticeable on higher input units.
 - Noisy, hard blue flames, flames lifting from the burner, luminous or yellow stringy flames indicate an incorrect setup. Check that the unit is using the correct gas. This information

is on the rating plate and the label on the side of the gas valve control. Poor flames can also be caused by incorrect gas pressures or burner orifice size, inadequate or contaminated air, a restriction in the venting system, or dirt entering the

- For units with cast iron burners, the flame presentation should be the same as sheet metal burners. Adjustment is possible on cast iron burners by changing the air shutter position on the burner inlet. If the flame needs adjusting, loosen the two screws and move the shutter. See Figure 12. If it is too far open, the flame will lift or will be noisy; if it is closed too far, the flame will be luminous and yellow. Once proper flame is obtained, tighten the screws to secure the air shutter.

NOTE: ➤ There is no adjustment on sheet metal burners.

➤ Always return the burner doors to their original position



gas supply. These conditions must be corrected to prevent a possible safety hazard.

Your water heater has been supplied with an anode rod that protects the tank from corrosion. As the rod works, it slowly dissolves over time and must be replaced when it becomes totally consumed. Depending on water conditions, an anode can last from two to ten years. As with any water heater, it is good practice to check the anode annually to see if it needs replacing (Figure 1, Item No. 15).

To inspect or change an anode:

- turn off the water heater
- close the cold inlet supply valve
- open a hot water tap supplied by the heater
- drain the water heater enough to empty the piping system
- using a 1 1/16" socket, remove anode and inspect or replace as required.
- refill system with water and restore water heater to operation

WARNING

Operating a water heater without an actively working anode rod will void the warranty.

VII) GENERAL OPERATION AND MAINTENANCE

Condensation

Water vapor in the flue gases can condense on the cooler surfaces of the water heater, especially during the start of a cold tank, during heavy use, or if the water heater is undersized. Condensation can also be produced in the vent piping if the vent piping becomes chilled (e.g. going through unheated areas) or if the dilution air is very cold.

Condensation may give the false impression that there is a tank leak as significant amounts can drip out of the bottom of the water heater. Once the water heater is operating at normal temperatures tank condensation should disappear. See venting section for dealing with condensation in the vent piping.

Cathodic Protection - Anode

Hot Water Odour

On occasion, and depending on your location, hot water may develop a strong odour. This can be especially problematic in regions where the water contains some sulphur, which results in hot water having a "rotten egg" smell.

If this occurs, drain the system completely, flush thoroughly and refill. If the problem persists, the anode rod may need to be changed from magnesium to one made of aluminum. In certain cases chlorination and flushing of the water heater may be required. Contact your dealer or water supplier.

Not Enough or No Hot Water

- Check that the water heater is operational
- Check that the thermostat is set high enough

- Check that you have not just run out of hot water due to heavy demand. If this is a routine problem, it may indicate an under-sized water heater.
- Have your gas company check input rate and water heater operation
- The E.C.O. may have tripped open (LED indicator on constantly). See E.C.O. below.

Energy Cut-off Control (E.C.O.)

This water heater is equipped with a control which has a built in E.C.O. (Energy Cut-off). The E.C.O. will shut the gas off, should the outlet water temperature exceed 200° F. If the E.C.O. has tripped, the entire gas control must be replaced. For gas control replacement, contact your local gas utility, or a qualified service

Water Heater Makes Noise

- During start up or under heavy use, condensation can drip on the burner causing a sizzling noise as the water is evaporated. This is normal and will stop once temperatures rise.
- Sediment, sand or scale can accumulate resulting in "rumbling" noises. Water heaters need to be flushed regularly to minimize buildup. Severe accumulations (more than 2" - 50 mm) can cause premature failure of the water heater and will void the warranty.
- Vent piping can vibrate if it is not supported properly. Ensure hangers and vibration isolators are properly installed.

Discolored Water

- Water rich in iron or other minerals can produce red or brown staining. Heating water generally worsens this situation.
- Black water can be an indication of organic contaminants in the water supply. This can be problematic in areas where the water is obtained from surface or contaminated sources. Organic particles can develop bacterial growth, causing potential health hazards. Contact your water supplier for proper filtration or water conditioning equipment. For bacterial problems contact your local health authority. See also "Hot Water Odor"
- A sudden appearance of rusty water can indicate the anode rod has been depleted. The remaining steel core wire may be corroding, releasing iron particles into the water. Inspect and replace as necessary.

Extended Non Use

technician. The replacement control must be an identical model to the control which has been removed.

Water Temperature is Too Hot

- Check that thermostat setting is not too high
- Water heaters used for dishwashers, space heating or laundry facilities generally require higher temperatures than domestic use. Install anti-scald tempering valves as instructed in the safety warnings
- If the problem persists, contact your dealer or gas supplier

Hydrogen gas can be produced by water heaters in service but on standby for long periods of time (generally two weeks or more). See safety warnings in the front of the manual Hydrogen gas is extremely flammable. Use caution in opening faucets.

Tank Flushing

Periodically (monthly) drain approximately 2 gallons (8 liters) from the tank through the drain valve. This will minimize sediment buildup on the tank bottom.

Caution: WATER WILL BE HOT.

If scale removal is being considered, contact your dealer for proper procedures. **DO NOT USE HYDROCHLORIC ACID (HCL)** based cleaners. Thoroughly flush after any chemical cleaning.

Vent Maintenance

Inspect the venting system periodically (minimum annually) to make certain that the venting passageways, vent terminal and blower assembly are free and unobstructed. Check that the vent connections are free and unobstructed, Check that the vent connections and vent joints are properly positioned and securely attached. In areas that have a high level of airborne particles (e.g. lint, sawdust, process smoke, etc.) Inspection and cleaning may need to be done more frequently.

Relief Valve Check

Inspect the relief valve annually to ensure proper operation. This involves opening the valve to check that it is flowing freely and that there are no blockages. Provide a bucket or drainage for the expelled water. Lift the lever and let it snap shut. The

water should stop instantly. **Warning: WATER WILL BE HOT** and water flow can be forceful. If the valve does not function properly, it must be replaced.

In systems where the relief valve discharges periodically, this may be due to thermal expansion or to a thermostat that is operating at too high a temperature. In a closed water system, an expansion tank may be required. Contact your local plumbing inspector. For a malfunctioning thermostat, contact your gas supplier.

Burner Maintenance

Annually inspect the burner and combustion chamber area to ensure that no debris have fallen on the burner and that no foreign material has found its way into the combustion chamber. Observe the flame for proper operation, Sheet metal burners have no adjustment, so contact your gas supplier if there is a problem.

ALWAYS KEEP THE AREA AROUND THE WATER HEATER CLEAR OF COMBUSTIBLE MATERIALS. NEVER RESTRICT THE FLOW OF AIR TO THE WATER HEATER.

VIII) COMBINATION POTABLE WATER HEATING AND SPACE HEATING (COMBO HEATING)

This section serves as a guide for the installation and use of "Combo" heating systems utilizing a domestic water heater which has been specifically approved for such use. It is written for those knowledgeable in the required trades and professionals involved in the design and installation of Combo Heating Systems.

It is the responsibility of the installer/ designer to follow all applicable codes to ensure the effectiveness and safety of the installation.

Caution: **READ BEFORE PROCEEDING**

The following requirements must be met for the installation of Combo Heating Systems:

1. All components used for the distribution of water in the heating loop must be suitable for potable water. These include all piping, fittings, solder and fluxes, pumps for circulation of water, valves, etc.
2. The water heater **must not** be connected to a hydronic heating system that has been used previously.
3. No boiler treatment chemicals of any kind shall be introduced into the system.
4. The Combo System components must be selected and sized to meet and maintain the total calculated demands for both domestic service hot water and space heating requirement. The sizing and installation must be performed in accordance with good engineering practice such as ASHRAE Handbooks, HRAI, Hydronics Institute Manuals, CGA B149, NFPA 54, ANSI Z223.1, CSA F280, National/Provincial Building Codes, CSA C22.1, ANSI/NFPA 70, CSA B51 and/or codes having jurisdiction.
5. The air handler (fan coil) and/or the circulating pump in a baseboard hydronic loop will require a dedicated 120V circuit. This must be provided and identified for this purpose.
6. All piping between the water heater and the air handler or hydronic baseboard loop must be adequately insulated to reduce heat loss.

7. If local jurisdiction require a back-flow preventer in the cold water line, an expansion tank of adequate size must be installed.
8. To reduce the scald hazard potential, a mixing valve must be installed.

INSTALLATION

The installation of the water heater must follow sections I to X in this manual. The heating mode may be one of the following options:

A- A fan coil (air handler)

B- A hydronic baseboard (finned tube) loop/ In floor heating

A- Fan Coil (see figure 13)

The following is a list of requirements for the installation of the heating loop to the water heater.

- 1) Install shut-off valves and unions so that the water heater can be isolated from the heating module should servicing of the water heater become necessary.
- 2) Install a drain valve at the lowest point of the heating loop so that water can be drained from the heating module without affecting the water heater.
- 3) If the air handler does not have a venting means at the highest point of the piping arrangement, install an air bleed at the highest point of the plumbing arrangement.

B- Baseboard Radiator Heating (see figure 13)

The following is a list of requirements for the installation of the heating loop to the water heater.

- 1) Install shut-off valves and unions so that the water heater can be isolated from the heating module should servicing of the water heater become necessary.
- 2) A drain valve must be installed at the lowest point of the heating loop so that water can be drained from the heating module without affecting the water heater.

- 3) Install air bleed valves at the highest points to purge air from the system.

