INSTALLATION & OPERATING MANUAL



Buffer Tanks

25
55
80

Intentionally left empty

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1.0 Safety information

Manual safety markings

Danger

Points out an immediate hazardous situation that must be avoided to prevent serious injury or death.

Warning

Points out a potential hazardous situation that must be avoided to prevent serious injury or death.

Caution

Points out a potential hazardous situation that must be avoided to prevent possible moderate injury and/or property damage.

Note

Points out installation, maintenance, and operational notes to enhance efficiency, longevity, and proper operation of your buffer tank.

Important safety instructions

Failure to read and comply with all instructions and applicable national and local codes may result in hazardous conditions that could result in property damage and injury to occupants, and in extreme cases to death. Keep instructions near the buffer tank for future reference.

When using electrical appliances, follow safety precautions to reduce the risk of fire, electric shock, or injury to persons, including:

- This buffer tank must be grounded if an electrical control is used.
- Install or locate the buffer tank only in accordance with the provided installation instructions.
- Use this buffer tank only for its intended use as described in this manual.
- As with any appliance, close supervision is necessary when used by children.
- Installation, start-up, and servicing of this buffer tank must be done with care and attention, and should only be performed by competent, qualified, licensed, and trained plumbing and heating technicians. Contact your nearest authorized service facility for examination, repair, or adjustment.

Warning

Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Read and understand the entire manual before attempting installation, start-up, operation, or service. Installation and service must be performed only by an experienced, skilled installer or service agency.

The buffer tank contains very hot water under high pressure. Do not unscrew any pipe fittings or attempt to disconnect any components of this buffer tank without positively ensuring that the water is cool and has no pressure. Always wear protective clothing and equipment when installing, starting up or servicing this buffer tank to prevent scalding injuries. Do not rely on the temperature and pressure gauges to determine the temperature and pressure of the buffer tank. This buffer tank contains components that become very hot when the heat source is operating. Do not touch any components unless they are cool.

Failure to follow all instructions in the proper order can cause personal injury or death. Read all instructions, including all those contained in component manufacturers' manuals before installing, starting up, operating, maintaining, or servicing the buffer tank.

Caution

To reduce the risk of excessive pressure, install pressure protective equipment as required by local codes, but no less than a pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic inspection of production.

This relief valve must be marked with a maximum set pressure not to exceed the maximum working pressure of the hydronic system. Install the relief valve and orient it or provide tubing so that any discharge from the valve will exit only within 6 inches above a suitable drain. The discharge opening must not be blocked or reduced in size under any circumstances.

Note

This appliance must be installed in accordance with installation regulations required in the area where the installation is to be made. These regulations must be carefully followed in all cases. Authorities having jurisdiction should be consulted before the installation is made. All wiring must adhere to the National Electrical Code NFPA 70, latest edition in the US and the Canadian Electrical Code, latest edition in Canada.

2.0 Specifications

Specification	25	55	80
Diameter Inches (cm)	20.1 (51.1)	21.8 (55.5)	23.8 (60.4)
Height Inches (cm)	38.6 (98.0)	61.7 (156.8)	68.9 (175.0)
Volume Gallons	26.4	52.8	79.3
Max. Operating Pressure PSI	150	150	150
Max. Temperature °F (°C)	185 (85)	185 (85)	185 (85)
Weight Pounds (kg)	40 (18)	66 (30)	86 (39)
Shipping Weight Pounds (kg)	53 (24)	84 (38)	106 (48)
Connection Size Inches	1.5	1.5	1.5

Table 1 *25, 55, 80 Models*

2.1 Dimensions

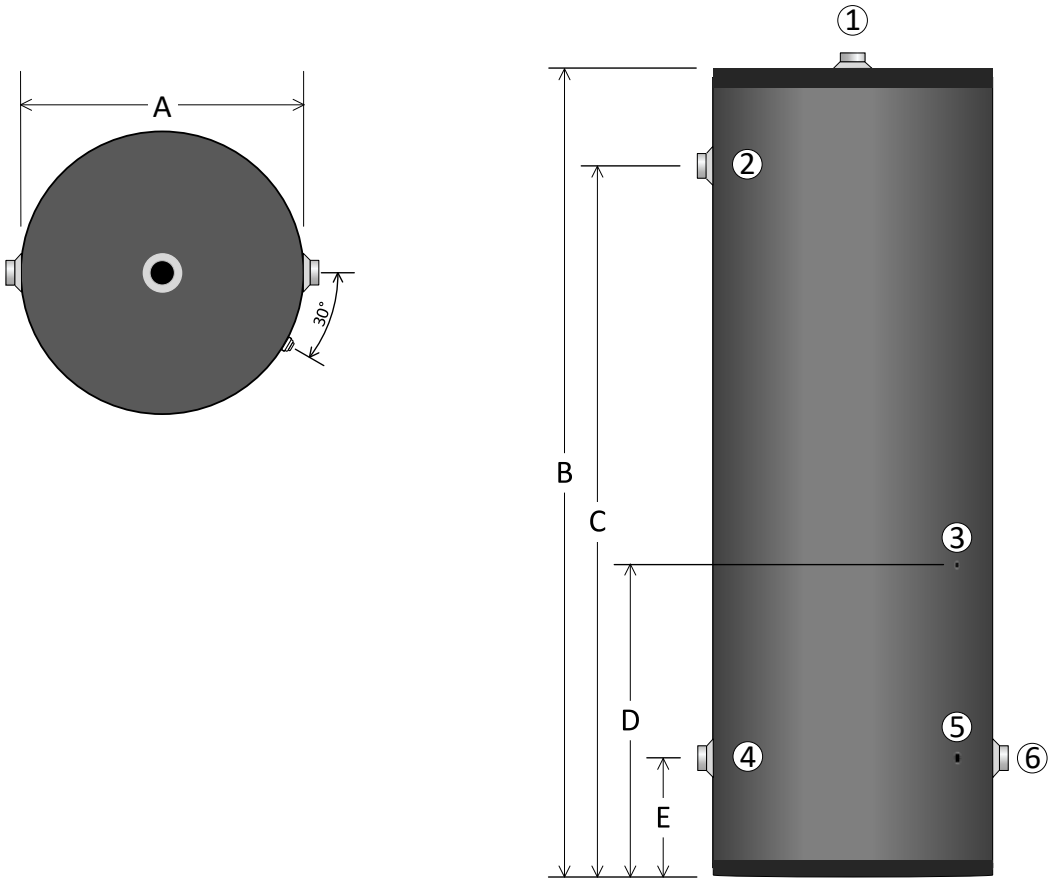


Figure 1 *Buffer tank dimensions – 25, 55, 80*

Dimension	25	55	80
A = Diameter Inches (cm)	20.1 (51.1)	21.8 (55.5)	23.8 (60.4)
B = Height Inches (cm)	38.6 (98.0)	61.7 (156.8)	68.9 (175.0)
C = Heat Supply Inches (cm)	30.7 (78.0)	52.6 (133.7)	60.3 (153.2)
D = Sensor / Aquastat Well Inches (cm)	22.5 (57.0)	24 (61.0)	26.3 (66.7)
E = Heat Return & Drain & System Return Inches (cm)	9.6 (24.5)	10.4 (26.5)	10.1 (25.7)

Legend	25, 55, 80
1	System Supply (1 ½″ M)
2	Heat Supply (1 ½″ M)
3	Sensor / Aquastat Well
4	Heat Return (1 ½″ M)
5	Drain (¾″ F)
6	System Return (1 ½″ M)

3.0 Introduction

3.1 Application

The buffer tank is designed for use with heat pumps and low mass boilers to reduce short cycling in systems where the heat required is often less than the heat provided to the system. The heat source will short cycle if its minimum output is greater than the current heating system load. Short cycling can lead to reduced operating efficiency and shorter equipment life.

The buffer tank has four 1 ½" male connections, two for the heat source and two for the heating system. The buffer tank serves as both a thermal buffer as well as a hydraulic separator between the heat source and the heating system. A 3/8" well can accept a temperature sensor or aquastat to monitor and maintain the tank temperature.

The buffer tank is constructed of stainless steel with 2" of polystyrene insulation and a polypropylene jacket resistant to scratches and dents.



Warning

This buffer tank must only be used in hydronic heating systems. This buffer tank is not for use in hydronic cooling applications. The installation must comply with all applicable plumbing codes. Do not operate the system above the maximum temperature and pressure specified on the rating label. Failure to comply may result in personal injury, property damage, or death.



Warning

This buffer tank is not for use in potable water systems.

3.2 Conformity

Inspect shipment carefully for signs of damage. All equipment is carefully inspected and packed. Our responsibility ceases upon delivery of the buffer tank to the carrier. Any claims for damage or shortage, must be filed immediately against the carrier. No claims for variances or shortages will be allowed by the manufacturer.

4.0 Before installation

4.1 Buffer tank sizing

The operating conditions of your hydronic system will determine the buffer tank size using this equation:

$$V = \frac{t(Qsource - Qload)}{500(\triangle T)}$$

V = Minimum buffer tank volume (gallons)

t = Heat source minimum operating time – recommend 8 minutes (minutes)

Qsource = Heat source minimum output rate (Btu/h)

Qload = Heating system minimum load (Btu/h)

△T = Buffer tank differential – recommend 10°F (°F)

Example: Calculate the buffer tank size required for a boiler with a minimum firing rate of 15,000 BTU/h and a minimum heating system load of 3,000 BTU/h.

$$V = \frac{8(15{,}000 - 3{,}000)}{500(10)} = 19.2\ gallons$$

5.0 Piping

5.1 Piping Guidelines

- The buffer tank should be installed between the heat source and the heating system. See section *Piping Diagrams on page 12* for guidance.
- The buffer tank has four 1 ½" male connections. Two on the left side for the heat source and two for the heating system, one on the top for the heating system supply and one on the right side for the heating system return.
- An air vent must be installed on the top heating system supply connection to prevent air from becoming trapped in the top of the tank.

Note

Installers should contact local water purveyors about the suitability of their supply for use in hydronic heating systems. If uncertain about the water quality, consult a local water treatment expert about testing the water, and if necessary, treating the water.

Alternatively, water or hydronic fluid of known quality can be brought to the site.

Warning

Do not use automotive-type ethylene or any other type of automotive antifreeze, or undiluted antifreeze of any kind in the heating system. This may result in severe heating system damage. Installers are responsible for ensuring that glycol solutions are formulated to inhibit corrosion in hydronic heating systems of mixed materials. Improper mixtures and chemical additives may cause damage to ferrous and non-ferrous components as well as damage to non-metallic, wetted components, normally found in hydronic systems.

Ethylene glycol is toxic and may be prohibited for use by codes applicable to your installation location. For environmental and toxicity reasons, we recommend only using non-toxic propylene glycol and non-toxic water additives of any kind.

Note

The piping drawings in Section 7.0 are simple guides to a successful installation. Many necessary components are not shown, and details are left out, so the drawings have greater clarity. We require that our buffer tanks be installed by licensed and experienced trades people who are familiar with the applicable local and national codes. System design is to be completed by an experienced hydronic designer or engineer. The application drawings in this manual are only part of the finished design. You must carefully read and follow these installation instructions, and just as importantly, the installation instructions for the heat source you are using with the buffer tank.

6.0 Electrical

6.1 Temperature control

The buffer tank well can accommodate a field supplied temperature sensor or aquastat to monitor the tank temperature and enable the heat source when the water temperature falls below the setpoint. A temperature sensor allows the heat source to constantly monitor the buffer tank temperature. An aquastat regulates the buffer tank temperature by closing a contact when the buffer tank temperature falls below the aquastat setpoint.

Warning

You must solidly affix the temperature sensor/aquastat with a retainer clip or cap to prevent it from falling out or from being pulled out. If the temperature sensor/aquastat is pulled out of the well, a continuous call will be generated, resulting in elevated water temperatures which could damage low temperature heating systems.

Install all electrical wiring and grounding according to the National Electrical Code NFPA 70, latest edition in the US and the Canadian Electrical Code, latest edition in Canada.

6.2 Installing a temperature sensor

1. Insert the temperature sensor bulb fully into the well on the side of the buffer tank and secure to prevent it from falling out.
2. Connect the temperature sensor wires to the appropriate terminals of a compatible heat source using an electrical junction box approved for the application. Reference the heat source installation manual for wiring details.
3. Adjust the setpoint on the heat source to the appropriate temperature for the heating system.

6.3 Installing an aquastat

1. Carefully bend the capillary tube/sensing bulb so that it is at a right angle to the back of the aquastat.
2. Loosen the mounting screw and carefully insert the sensing bulb into the well on the side of the buffer tank until the aquastat mounts to the well head.
3. Tighten the screw to lock in place.
4. Wire the aquastat to the heat source or zone panel. Reference the heat source/zone panel manual for wiring details.
5. Set the buffer tank setpoint on the aquastat to the appropriate temperature for the heating system.

7.0 Piping Diagrams

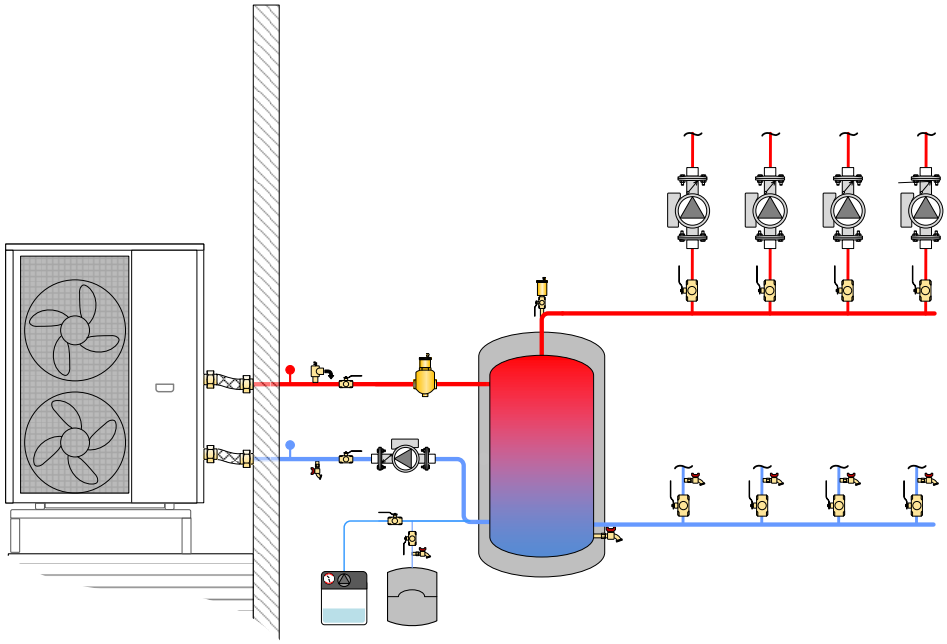


Figure 2 *Air to water heat pump and buffer tank piping*

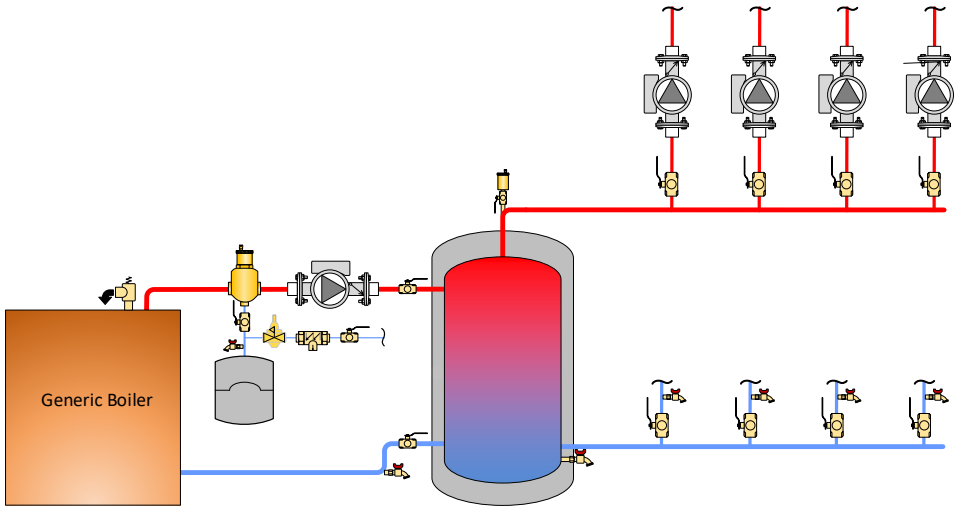


Figure 3 *Generic boiler and buffer tank piping*

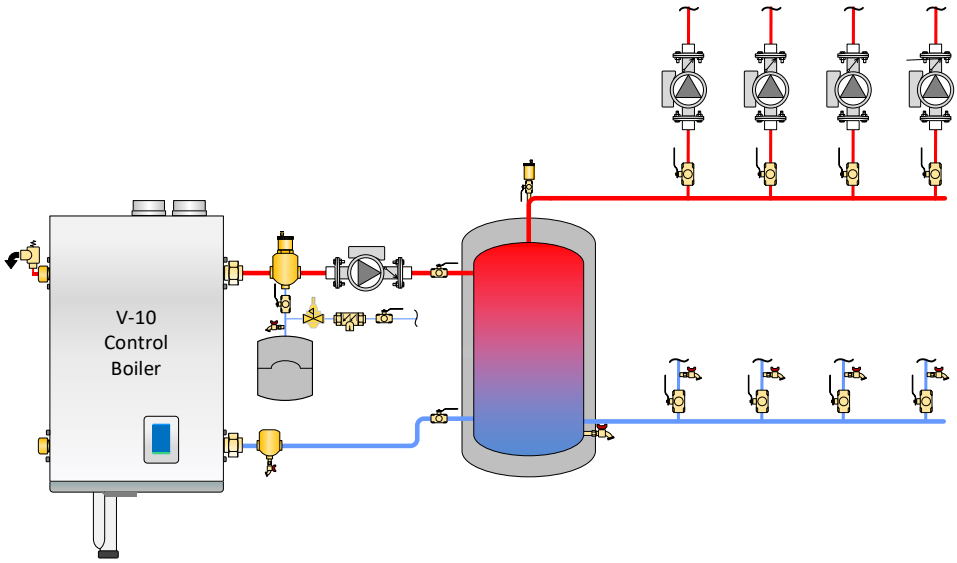


Figure 4 *V-10 control boiler and buffer tank piping*

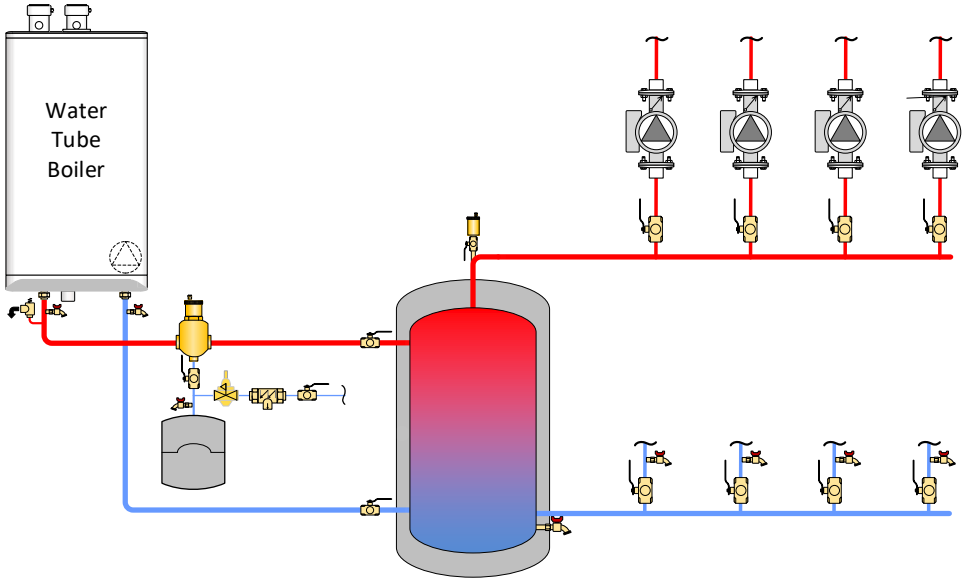


Figure 5 *Water tube boiler and buffer tank piping*

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