

# INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS

## HEAT-FLO HYDRONIC BUFFER TANKS

MODELS HF-40-BT, HF-60-BT, HF-80-BT, AND HF-115BT



In order to insure proper service, the following information is provided to assist in enabling the installation, operation, and maintenance of this tank. When the installation is completed, keep this manual with the tank.

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**Uxbridge, MA 01569**

**Bulletin IO-BT 090911**

## **IMPORTANT INFORMATION – READ CAREFULLY**

NOTE: The equipment shall be installed in accordance with those installation regulations required in the area where the installation is to be made. These regulations shall be carefully followed in all cases. Authorities having jurisdiction shall be consulted before the installations are made.

All wiring on water heaters shall be in accordance with the National Electrical Code and/or local regulations.

### **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.

This tank can contain very hot water under high pressure. Do not unscrew any pipe fittings or attempt to disconnect any components of this tank without positively assuring that the water is cool and has no pressure. Always wear protective clothing and equipment when installing, starting up or servicing this tank to prevent scalding injuries. Do not rely on the pressure and temperature gauges to determine the temperature and pressure of the tank. This tank contains components that become very hot when a boiler 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 pressures and temperatures in this tank, install pressure protective equipment 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 of listed equipment or materials, as meeting the requirements for Relief Valves and Automatic Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22-latest edition. This valve must be marked with a maximum set pressure not to exceed the marked working pressure of the hydronic system.

The pressure of the heat transfer medium must be limited to a maximum of 150 psig by an approved safety or relief valve.

### **DANGER**

DO NOT store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance. If you smell gas vapors, DO NOT try to operate any appliance - DO NOT touch any electrical switch or use any phone in the building. Immediately, call the gas supplier from a remote located phone. Follow the gas supplier's instructions or if the supplier is unavailable, contact the fire department.

## IMPORTANT SAFETY INSTRUCTIONS

WARNING – When using electrical appliances, basic safety precautions to reduce the risk of fire, electric shock, or injury to persons should be followed, including:

READ ALL INSTRUCTIONS BEFORE USING THIS BUFFER TANK..

1. This tank must be grounded if any electrical control is used. Connect only to properly grounded outlet.
2. Install or locate this buffer tank only in accordance with the provided installation instructions
3. Use this tank only for its intended use as described in this manual.
4. As with any appliance, close supervision is necessary when used by children.
5. This tank should be serviced only by qualified personnel. Contact nearest authorized service facility for examination, repair, or adjustment.

## SAVE THESE INSTRUCTIONS

### Application

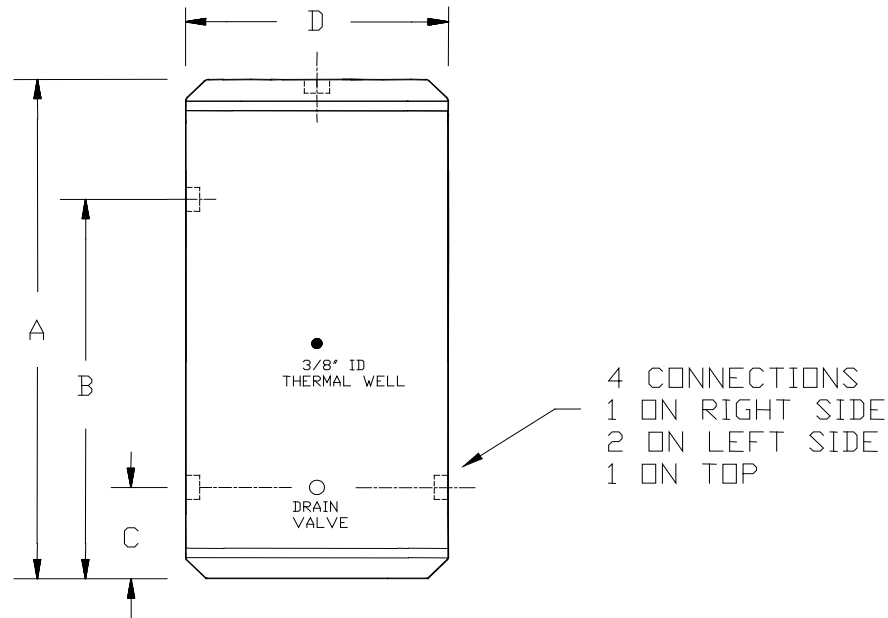
The primary application of a buffer tank is to reduce heat pump, chiller, or boiler short cycling. Hydronic buffer tanks are used in systems operating below the design load condition, which is most of the time, or in systems having several low BTU cooling or heating loads calling at different times. This can cause the heat pump or the boiler to short cycle, resulting in reduced operating efficiency and shorter equipment life.

The hydronic buffer tanks are built with 4 connections. Two connections can be piped to the heat pump or boiler, and two connections can be piped to the distribution system. If piped correctly, the tank can serve as both a thermal buffer and a hydraulic separator. The heat pump or boiler can be hydraulically decoupled from the distribution system. The tanks are all stainless steel construction with R-12 insulation, and an ABS jacket.

A 3/8" ID thermal well is located mid-tank. Thermistors can be inserted 3" into the well, or the well will accept the Honeywell L4006A controls.

Buffer tanks are available in 40, 60, 80, and 115 gallon capacities.

**Specify 1 1/4", 1 1/2", or 2" connections.**



Model	Volume (gal.)	A Height	B	C	D Diameter	Connections (NPT)	Max. Working Pressure (psi)	Approx. Ship Wt. (lbs.)
HF40-BT-XX	40	42.0	29.0	9.0	22.5	Specify	60	87
HF60-BT-XX	60	42.0	29.5	9.5	26.5	1 1/4", 1 1/2"	60	115
HF80-BT-XX	80	52.0	39.5	9.5	26.5	or 2" NPT	60	125
HF115-BT-XX	115	72.0	59.5	9.5	26.5		60	160

All dimensions in inches

-XX denotes connection size. Specify 1 1/4", 1 1/2", or 2" NPT.

The buffer tanks are all stainless steel construction, insulated with a thermoplastic jacket.

**WARNING: DO NOT use in potable water systems.**

**WARNING: Use this vessel only in hydronic heating systems. The installer must comply with all plumbing codes. Do not operate above the temperature or pressure specified on the rating plate. Failure to comply may result in personal injury, property damage, or death.**

An example of piping a buffer tank follows showing a water source heat pump application. In all applications note that the tank top fitting should be piped the distribution supply line to the air purger and vent. This way the tank will be self venting and no additional air vent is needed to install or maintain.

The objective in any application is to pipe the buffer tank such that the heating or cooling source is hydraulically decoupled from the distribution system.

# Buffer Tank Sizing - Calculating Capacity

The Heat-Flo buffer tanks are a simple, cost effective way to improve overall system operating efficiency by reducing unnecessary equipment short cycling. The recommended capacity or volume of a buffer tank is based on four variables.

1. The duration of the heating or cooling source “on time”. (minutes)

The desired length of “on time” for each run cycle depends on the type of equipment used. Heat pump and chiller manufacturers typically recommend a minimum of 5 to 10 minutes on time, and boiler manufacturers may recommend a minimum of 10 minutes “on time”. Check with your equipment manufacturer. Generally, the longer the on time, the higher the overall operating efficiency.

2. The minimum rate of heat input. (BTU/HR)

This is based on the heat pump or chiller output, or the boiler output at the minimum firing rate if the boiler has a variable input system that ramps input down as the demand decreases.

3. The minimum system load (BTU/HR)

This is the demand placed on the system with the smallest zone calling for heat.

4. The allowable tank temperature rise. (deg. F)

This varies depending on the type of heating or cooling system used, and on the design of the distribution system. Chillers may require a tight, (6 deg. F), differential to assure good dehumidification and prevent freezing, heat pumps may require a 10 deg. F differential to maintain a high COP, and boilers with hydronic heating distribution systems may require a differential anywhere between 10 to 40 deg. F depending on the application.

The following formula determines the tank volume:

$$V = \frac{T \times (Q \text{ heat input} - Q \text{ min. heat load})}{\text{Tank temp. rise} \times 500}$$

V = Buffer tank volume (gallons)

T = desired heat source “on cycle” (min.)

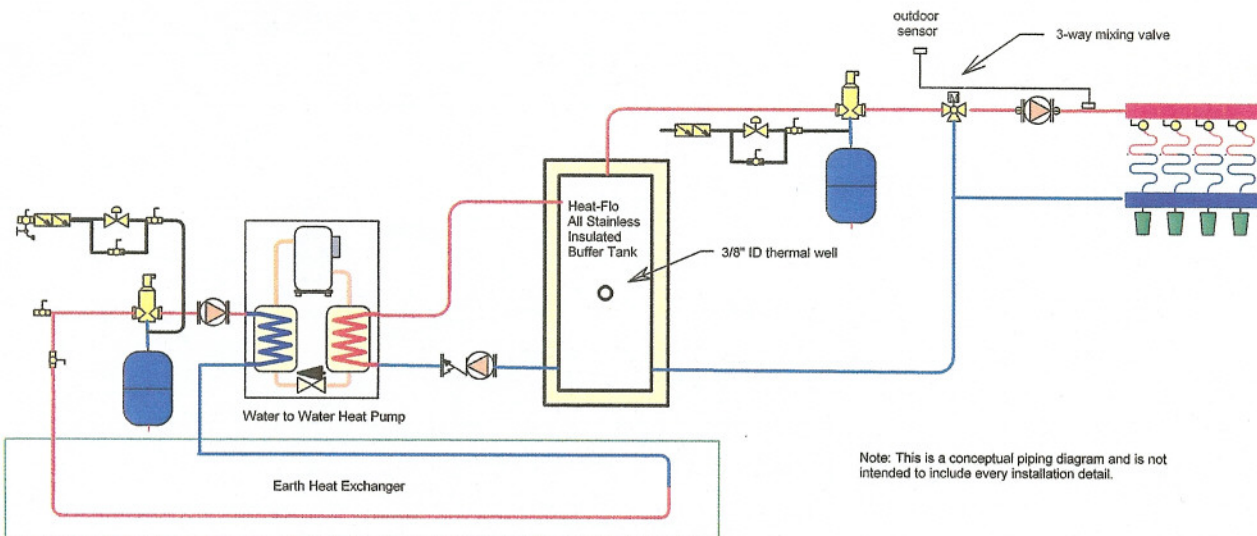
Q heat source = heat source output (BTU/HR)

Q min. heat load = heat output to minimum load

Tank temp rise (deg.F)

Water to Water Heat Pump Example: Town and Country Mechanical wants a minimum heat pump on time of 10 minutes. The heat pump output is 46,500 BTU/HR. The smallest zone is a 7,000 BTU/HR bathroom. The allowable temperature differential is 90 to 100 deg. F for the radiant heating zones.

$$V = \frac{10 \times (46,500 - 7,000)}{(100-90) \times 500} = 79.0 \text{ Gallons minimum volume. Choose the HF-80BT buffer tank.}$$



Note: This is a conceptual piping diagram and is not intended to include every installation detail.

Hydronic Buffer Tank applied to Water source heat pump application

# **Heat-Flo**

**HEATING PRODUCTS**

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