

## To the Installer:

Please attach these instructions next to the water heater.

## To the Consumer:

Please read these and all component instructions and keep for future reference.



# Storage Tanks

## Instruction Manual

Warranty, Registration Card and Parts List are included.  
Homeowner: Please remember to return the Registration Card!

### WARNING

Improper installation, adjustment, alteration, service or maintenance can cause serious injury or property damage. Refer to this manual. For assistance or additional information, consult a qualified installer or service agency.

### CAUTION

The recommended temperature for normal residential use is 120°F. The dial on the aquastat does not always reflect the out-coming water temperature and it could occasionally exceed 120°F. Variation in outcoming temperature could be based on factors including, but not limited to, usage patterns and type of installation. Test water at the tap nearest to the water heater and storage tank.

### WARNING

Hotter water increases the risk of scald injury. Before adjusting the water temperature setting, read this instruction manual. Temperatures at which injury occurs vary with the person's age and the length of exposure. The slower reaction time of children, elderly, or physically or mentally challenged persons increases the scalding hazard to them. It is recommended that lower water temperatures be used where these exposure hazards exist. Households with small children or invalids may require a temperature setting less than 120°F to prevent accidental contact with hot water. To produce less than 120°F, use point-of-use temperature limiting devices.

If higher water temperature is needed in part of the water system, automatic temperature limiting devices must be used on all lines to water taps.

### INSTALLER RESPONSIBILITIES

Please read all instructions before installing or placing this storage tank into service. This unit must be installed by licensed or authorized installers, or technical personnel that service water heating equipment. The Storage Tank must be installed in accordance with all local codes and ordinances.

### HANDLING

Before uncrating, check for shipping damage. Report any damage to your carrier. Note damage on bill of lading or delivery receipt and file a claim.

### LOCATION

This storage tank should be located in a central location to the piping system, as close as possible to the heat source and in an area not subject to freezing temperatures. Leave sufficient space for servicing and maintaining the tank.

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THIS MANUAL HAS BEEN PREPARED TO ACQUAINT YOU WITH THE INSTALLATION, OPERATION, AND MAINTENANCE OF YOUR WATER HEATER AND TO PROVIDE IMPORTANT SAFETY INFORMATION.

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Read all instructions thoroughly before attempting installation or operation of your water heater. Keep these instructions for future reference.

Local plumbing and electrical codes must be followed in the installation of this storage tank. In the absence of a local code use the UNIFORM PLUMBING CODE and the NFPA Code. Local codes may supersede instructions in this installation manual.

These instructions are a guide for the correct installation of the storage tank. The manufacturer will not be liable for damages caused by failure to comply with the installation and operating instructions outlined on the following pages.

If you lack the necessary skills required or have difficulty following the directions, seek help from a qualified person for that part of the installation you do not understand.

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FAILURE TO FOLLOW THESE INSTRUCTIONS OR ALL APPLICABLE BUILDING CODES AND REGULATIONS VOIDS THE WARRANTY ON THIS WATER HEATER.

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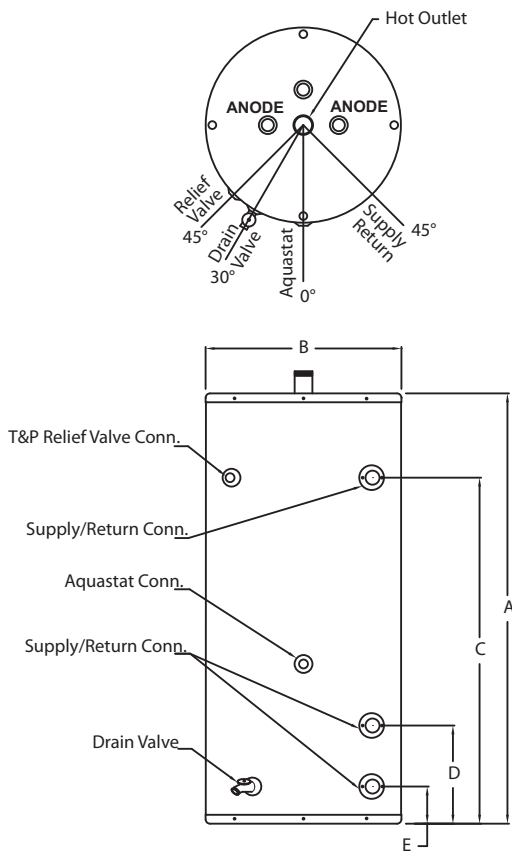


Figure 1: 30ST, 50ST

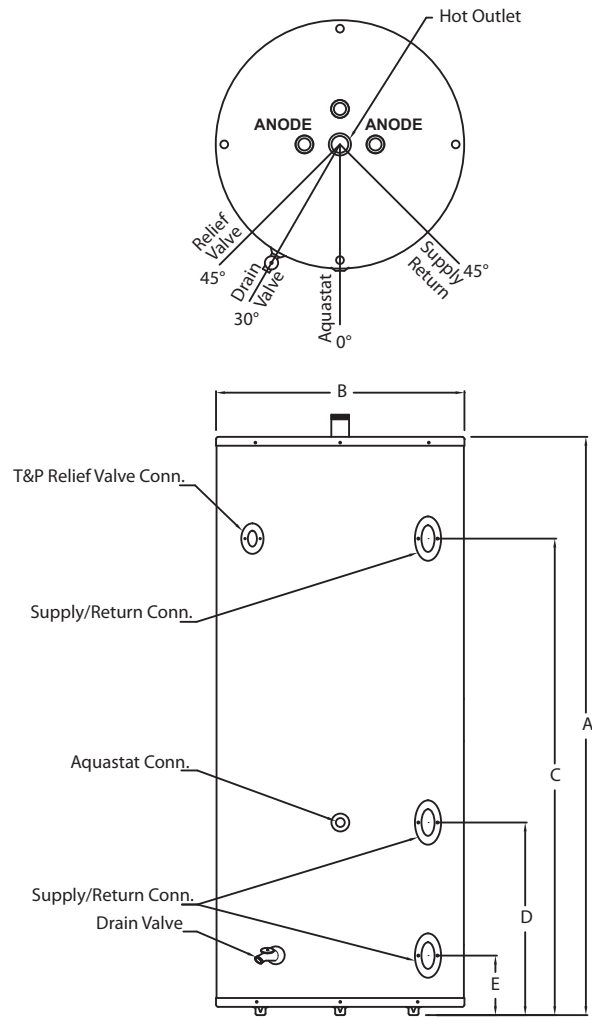
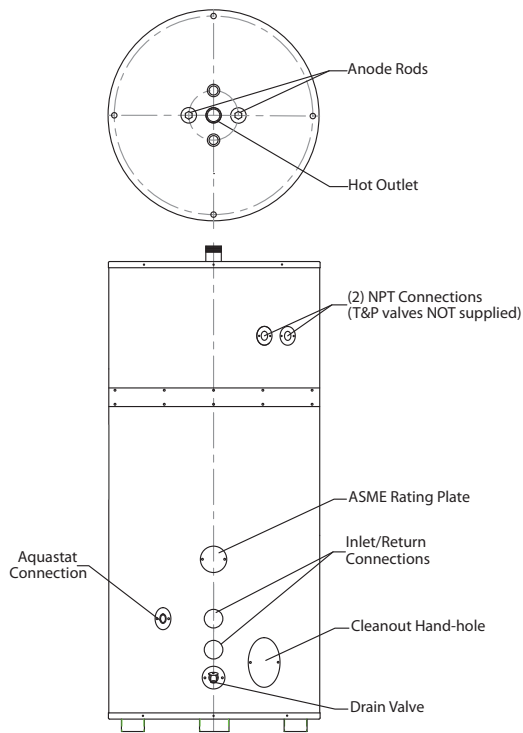


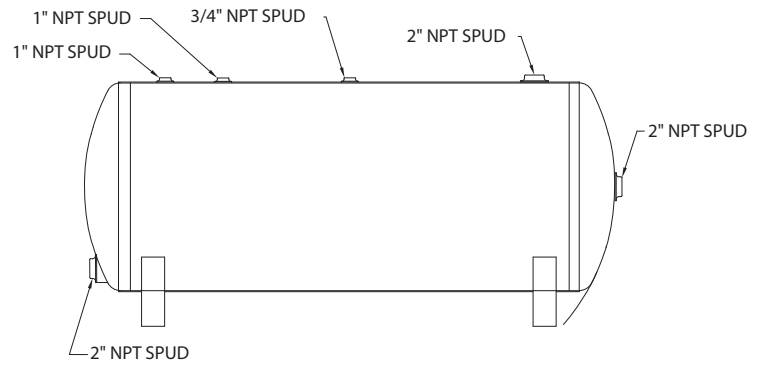
Figure 2: 80ST, 119ST

Table 1: ST Dimensions

	Storage Capacity (gal.)	T&P Fitting	Supply/Return Fitting	Hot Outlet	Aquastat Fitting	Dimensions					Weight (lbs.)
						A	B	C	D	E	
30ST	30	3/4"	2"	2"	3/4"	39 1/2"	20"	30"	11 1/16"	4 3/16"	150
50ST	50	3/4"	2"	2"	3/4"	48 1/2"	22"	39"	11 1/16"	4 3/16"	190
80ST	80	1"	2"	2"	3/4"	60 1/2"	24"	50"	21"	6"	250
119ST	119	1"	2"	2"	3/4"	65 1/2"	28"	54"	22"	7"	385



**Figure 3: ASME Vertical**



**Figure 4: ASME Horizontal**

**Table 2: ASME ST Dimensions**

	Model	2" Insulation w/ External Jacket	Storage (gal)	Working Pressure	Overall Diameter	T&P Relief Valve Conn.	Inlet/ Return Conn.	Hot Outlet Conn.	Aquastat Conn.	Overall Height/ Length	Shipping Weight (lbs)
Vertical	119ST-A-150	Standard	119	150	28"	1 x 1" NPT	2"	2"	3/4"	65 1/2"	385
	200ST-A-125	Standard	200	125	34"	2 x 1" NPT	2 1/2"	2 1/2"	3/4"	79 1/2"	872
	200ST-A-150	Standard	200	150	34"	2 x 1" NPT	2 1/2"	2 1/2"	3/4"	79 1/2"	872
	250ST-A-150	Standard	250	150	36"	2 x 1" NPT	2"	2"	3/4"	87"	950
	350ST-A-150	Standard	350	150	40"	2 x 1" NPT	2"	2"	3/4"	92"	1,225
	400ST-A-150	Standard	400	150	44"	2 x 1" NPT	2"	2"	3/4"	86"	1,345
	500ST-A-150	Standard	500	150	48"	2 x 1" NPT	2"	2"	3/4"	88"	1,585
Horizontal	200ST-GA-M	Not Available	200	150	30"	2 x 1" NPT	2"	2"	3/4"	77"	735
	350ST-GA-M	Not Available	350	150	36"	2 x 1" NPT	2"	2"	3/4"	88"	1,225
	400ST-GA-M	Not Available	400	150	36"	2 x 1" NPT	2"	2"	3/4"	92"	1,345
	500ST-GA-M	Not Available	500	150	42"	2 x 1" NPT	2"	2"	3/4"	88"	1,585
	750ST-GA-M	Not Available	750	150	42"	2 x 1" NPT	2"	2"	3/4"	124"	2,375
	1000ST-GA-M	Not Available	1,000	150	48"	2 x 1" NPT	2"	2"	3/4"	138"	3,165



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## **WHEN YOU RECEIVE YOUR NEW STORAGE TANK**

Check the new equipment to see if all components are in good condition. The T&P valves, aquastat and immersion well are supplied by the installer.

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## **TEMPERATURE CONTROLS**

Bock storage tanks are equipped with  $\frac{3}{4}$ " tapings for the installation of immersion temperature controls. Any temperature control approved for use in hot water systems is acceptable. Bock recommends the use of a control with an adjustable differential so that the differential can be adjusted to match that of your heat source controls. Setting the storage tank temperature control 5° lower than the water heater temperature control is also recommended. This is to ensure that when the storage tank calls for heat and the circulator is turned on, the water being circulated is cool enough to cause the water heater to start. If the burner does not start then the circulator could run for long periods of time, wasting energy.

**Note:** The recommended water temperature for domestic use is 120°. Higher water temperatures can result in scalding. If higher or lower water temperatures are needed, point of use tempering devices are recommended.

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## **T&P VALVES**

Temperature and pressure relief valves must be installed on all storage tanks by the installer. All Bock storage tanks are also equipped with  $\frac{3}{4}$ " or 1" tapings for the installation of properly sized temperature and pressure relief valves. These are located on the side near the top of vertical tanks and on the top surface of horizontal storage tanks. Relief valves are rated for maximum system pressure and temperature as well as Btu input of the heating appliance. This information is normally supplied on a metal tag attached to the end of the valve. For a normal domestic water system maximum system pressure is 150 psi and temperature limit is 210°F. The Btu per hour rating will be listed next to the AGA or CSA logo on the tag under the temperature and pressure data. Be certain to use a relief valve that is rated for the Btu per hour input of the heating appliance. For example, if you are connecting a storage tank to a water heater with a 50,000 Btu per hour input then the relief valve installed in the storage tank must be rated for a minimum of 50,000 Btu per hour.

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## **PIPING**

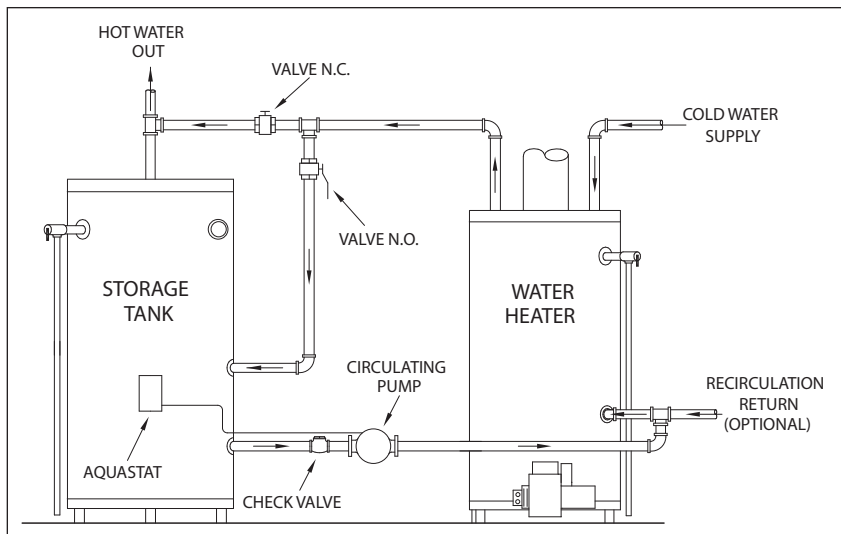
Bock storage tanks are equipped with many different fitting sizes and configurations depending on intended use. However, all storage tanks will have some common features. All Bock storage tanks will have two or more anode rods installed through the top of the storage tank. Bock storage tanks typically have three large tapings, normally 2 inches NPT or larger, in the side of the tank. The exact location of these fittings will vary depending on tank model and any special options ordered. The tapping nearest the bottom of the tank is used as a cold water inlet and/or a connection to return water from the storage tank to the heat source. A second tapping of similar size located higher up the side of the tank is used to return heated water from the heat source. A hot water outlet is located on the top of the tank.

## INSTALLATION

There are many factors to consider when installing a storage tank. How will the system be used? What are the hot water demands of the system? Why is a storage tank being installed? Are the peak demands frequent such as a home with multiple showers or very intermittent such as a church kitchen? The answers to these questions will help you determine what your system should look like. The following drawings will show you some typical installations. If your system does not fit one of these applications, remember the basic principles that are illustrated here:

1. Hot water should exit the top of the tank.
2. If cold water enters the storage tank, it should enter through a fitting on the lower side of the storage tank. Examples: boiler system, reverse storage system
3. A circulator suitable for use with potable water must be used to move cool water from the storage tank to the heat source during stand-by periods.
4. The circulator will normally draw cool water out of a large fitting near the bottom on the side of the storage tank and return it to the heat source. (The reverse storage system is an exception to this.)
5. Heated water will return to the storage tank from the heat source to the large fitting nearer the center of the storage tank or the large fitting near the top of the side.

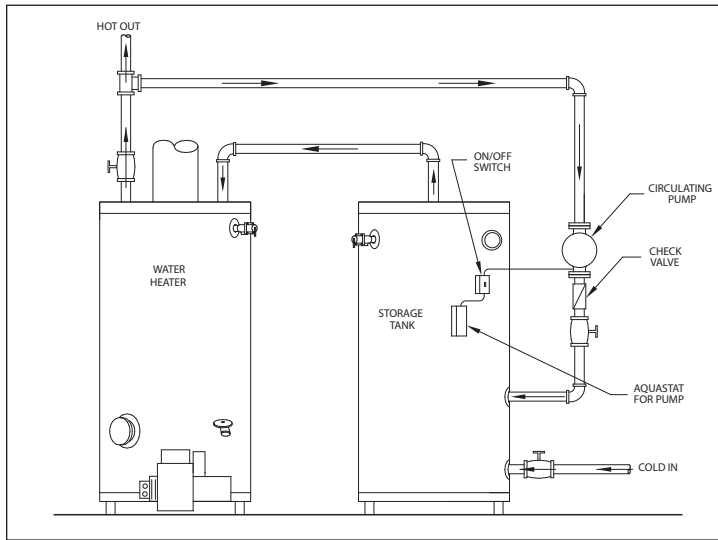
### DRAWING #1



Drawing #1 shows a typical installation for a home or business with high peak loads such as multiple showers in the morning. This drawing also shows an optional bypass system (N.C. Valve) to allow the storage tank to be isolated from the system. Cold water is connected to the inlet of the water heater. Hot water is plumbed from the hot water outlet of the water heater to the middle fitting on the side of the storage tank. Hot water for the home will be drawn off the top of the storage tank. The lower fitting in the side of the storage tank is connected to the cold water inlet or

recirculation return/drain valve fitting of the water heater with a circulator. The circulator is controlled by the storage tank aquastat and draws cool water off the bottom of the tank and returns it to the water heater for reheating. As a result, heated water is returned from the water heater to raise the temperature of the storage tank. A check valve is also used to prevent cold water entering the water heater from flowing backwards through the circulator and diluting the hot water in the storage tank.

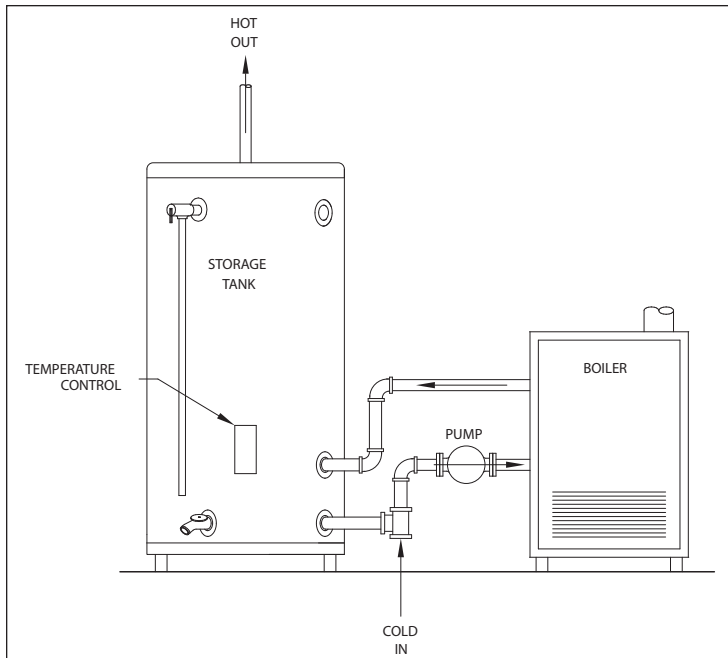
## DRAWING #2



The reverse storage tank system, drawing #2, is a variation on the typical system discussed previously and is intended for use in an installation with only occasional high loads. An example of this is a church kitchen that serves a pancake supper once a month. This drastically reduces energy use (from stand-by losses of the storage tank) by allowing the storage tank to be shut off during the times of low use. This system brings cold water into the bottom of the storage tank. Water flows out the top of the storage tank and into the cold water inlet of the water heater. All hot water for the facility flows out the

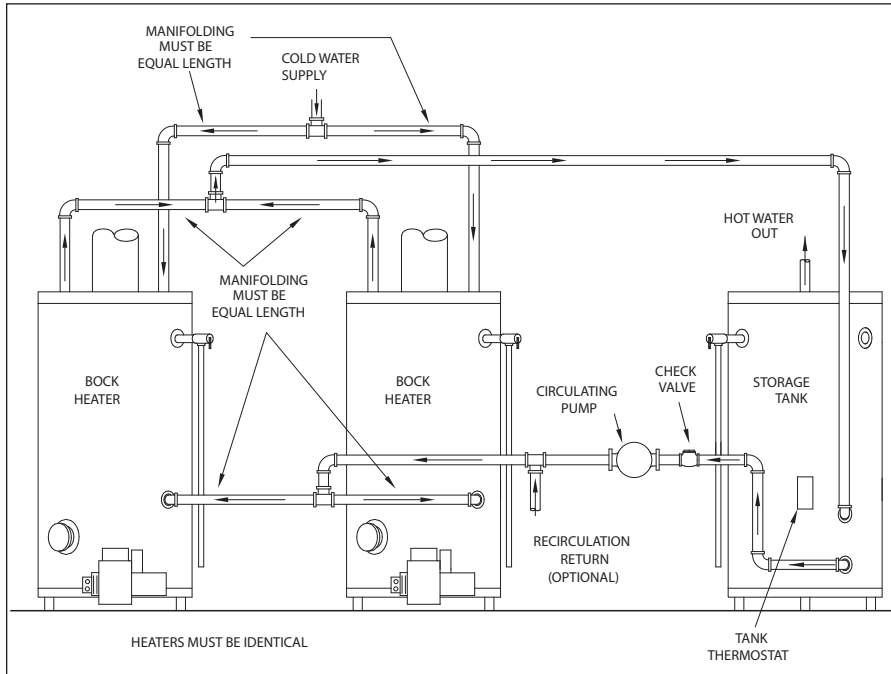
top of the water heater. A circulator is connected to the hot water outlet of the water heater to draw hot water back into the storage tank. In times of low hot water use this pump can be turned off by a switch or timer preventing the storage tank from being heated. A check valve is also used as in the other systems to prevent cold water from diluting the hot water stream.

## DRAWING #3



Drawing #3 shows a storage tank connected to a boiler. This system is essentially the same as the typical system shown in drawing #1. The only significant difference is the heat source. In this configuration cold water is free to enter the storage tank through the bottom fitting or by flowing through the boiler before entering the storage tank. No check valve is used.

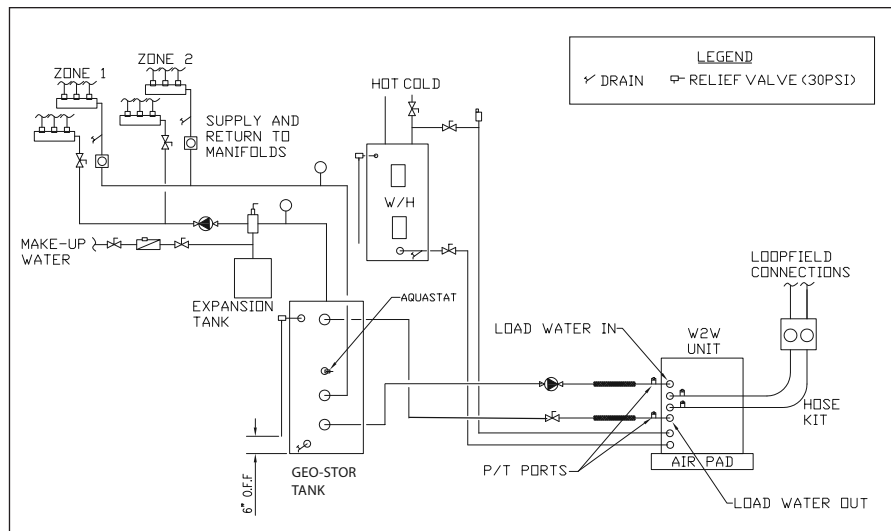
## DRAWING #4



Drawing #4 shows a typical system with two water heaters connected in parallel supplying hot water to the storage tank which then supplies hot water to the building load. Plumbing is identical to the typical system shown in drawing #1 with the exception of the parallel water heaters. The storage tank can also be connected to two water heaters in series. This installation would look similar to the parallel system. The difference is that all cold water will be fed to the first water heater in the series, heated water from this heater will be fed to the cold water inlet of the second heater. Heated water from the second heater would then be fed to the

storage tank. Cool water return from the storage tank should be returned to the second water heater in the series.

## DRAWING #5



Drawing #5 shows a Bock storage tank piped to a water-water geothermal heat pump supplying heated water to a radiant floor system (drawing courtesy of EnerTech Mfg).

## MAINTENANCE

All Bock storage tanks are equipped with magnesium anode rods. These rods must be checked annually and replaced when they become worn to  $\frac{3}{8}$ -inch diameter or less to ensure long tank life. The replacement interval will depend on water conditions. Failure to service and replace the anodes will shorten tank life and void the tank warranty.

Flush the storage tank periodically to remove sediment. ASME tanks are typically equipped with hand holes to aid in sediment removal.



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## **LIMITED WARRANTY**

### **Bock Water Heaters, Inc.**

**110 S. Dickinson Street**

**Madison, WI 53703**

**Phone: 608-257-2225**

#### **WHAT DOES THIS LIMITED WARRANTY COVER?**

**This limited warranty applies only to the original consumer purchaser.**

**General Defects and Malfunctions:** This warranty covers defections and malfunctions in your new storage tank for a period of one year from the original installation date. We will repair or replace, at our option, any defective or malfunctioning component of the storage tank. This limited warranty will terminate if you sell or otherwise transfer the storage tank, or the storage tank is installed at a location different from its original installation location.

**Tank:** We also warrant that the tank will not leak due to defective materials or workmanship for five years from the date of original installation or from date of manufacture in the event the Limited Warranty Registration Card was not completed and returned to manufacturer. If the tank is leaking and we have verified that the leak is due to a defect in materials and workmanship, we will replace the tank with a tank that is the nearest Bock model available at the time of replacement. If a replacement tank is provided, it will remain warranted under this section as if it were the original tank. For example, if we send you a replacement tank under this limited warranty two years after the original installation date, then the replacement tank will remain warranted for the remaining three years after the original installation date.

#### **HOW DO YOU GET SERVICE UNDER THE LIMITED WARRANTY?**

In order to be eligible for service under this warranty you **MUST** return the warranty registration card attached below within 30 days of purchasing the storage tank.

You must have a copy of the original sales receipt at the time you request service.

To get service under this limited warranty you should contact either the dealer or installer. If dealer or installer is unknown you can call us Monday through Friday between the hours of 8 o'clock a.m. to 5 o'clock p.m. Central Time at the following number: 1-608-257-2225.

You can also write us at the following address:

Bock Water Heaters, Inc.  
Warranty Support Group  
110 S. Dickinson Street  
Madison, WI 53703

We will respond not later than ten days after we have received your request for service.





### **WHAT DOES THIS LIMITED WARRANTY NOT COVER?**

This limited warranty does not cover storage tanks that are or were:

- a. Incorrectly installed, especially where the installation violates state or local plumbing, housing or building codes.
- b. Operated at inappropriate settings, excessive pressures or temperatures.
- c. Exposed to adverse local conditions and specifically sediment or lime precipitation in the tank or corrosive elements in the atmosphere or unacceptable water quality.
- d. Installed outside the United States or Canada.
- e. Accidentally damaged.

Also, we will not cover the following charges, costs and losses:

- a. Any freight or delivery charges.
- b. Any removal or installation charges.
- c. Charges to return the storage tank or part to the manufacturer.
- d. Water damage, loss or damage to property, inconvenience or loss of use.

### **WHAT WILL VOID THE LIMITED WARRANTY?**

If you do any of the following, you will void this limited warranty:

- a. Fail to return the warranty registration card within 30 days.
- b. Fail to retain an original copy of your sales receipt.
- c. Fail to retain the actual rating plate from the storage tank.
- d. Alter or remove the serial number.
- e. Transfer or sell the storage tank.
- f. Remove the storage tank from its original location and install it somewhere else
- g. Fail to follow the care and maintenance instructions provided with the storage tank.
- h. Remove the anode rods.
- i. Fail to inspect and replace the anode rods (you must retain and present your paid receipts as proof of anode rod replacement).

### **HOW DOES STATE LAW RELATE TO THIS LIMITED WARRANTY?**

This is a limited warranty. WE MAKE NO OTHER EXPRESS WARRANTIES WITH RESPECT TO THIS STORAGE TANK. We will not assume, nor authorize any person to assume for us any other liability in connection with the sale or operation of this storage tank. ANY IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR APPLICATION, IMPOSED ON THIS SALE UNDER THE LAWS OF THE STATE OF SALE ARE LIMITED TO ONE YEAR. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

WE WILL NOT BE RESPONSIBLE FOR WATER DAMAGE, LOSS OF USE OF THE UNIT, INCONVENIENCE, LOSS OR DAMAGE TO PERSONAL PROPERTY, WHETHER DIRECT OR INDIRECT, AND WHETHER ARISING IN CONTRACT OR TORT. Some states do not allow the exclusion of incidental or consequential damages, so the above exclusion may not apply to you.



# NOTES



# NOTES





Storage Tanks  
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