



Buffer Tank Air Eliminator

Total System Efficiency

System run time is important to overall operating efficiency. To prevent short cycling of the system, it is important to minimize boiler on/off cycling.

Lochinvar Buffer Tanks are a cost effective way to enhance small load effectiveness and increase heating system efficiency. Lochinvar Buffer Tanks are also engineered as the system air separator, further reducing the installed cost of your system, since there is no need for an additional system air separator.

Outstanding Features:

- **Increase System Efficiency** - Prevent system short cycling for greater system efficiency and longevity.
- **Air Elimination System** - Eliminates the need for a separate system air separator. The unique air collection/elimination system has a built-in air separator with automatic air vent, which reduces system installed cost. The tank's tangential connections create a swirling action in the center of the unit as water enters and exits, pushing any air held in the system to the center of the tank.

The collection tube at the tank's center captures that air and releases it through the air eliminator installed on top of the tank.

- **ASME Construction** - All models constructed in accordance with ASME Section VIII, Div. 1 standards and labeled for 125 psi working pressure at 400°F.
- **Channel Iron Skid Mounted with Lifting Lugs** - For handling and installation ease.
- **Energy Saving Performance** - Jacketed tanks meet the efficiency requirements of the latest ASHRAE Energy Efficiency Standards. The 2" foam insulation provides low standby loss for optimum performance and economy.
- **Five Year Limited Warranty** - Provides protection against tank failure resulting from defects in materials or workmanship.

Optional Equipment:

- **Temperature & Pressure Gauge**
- **Handhole**
- **Manway (300 gallon and larger models)**
- **Extra Tappings**
- **Custom Tapping & Flange Sizes**

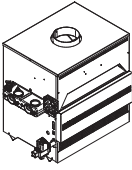

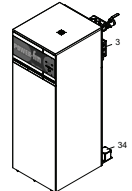
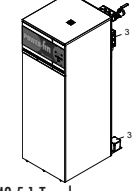
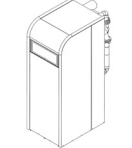


Buffer Tank Quick-Select Chart

1. Locate the desired boiler model number from the column on the left-hand side of the page.
2. Find the “Minimum System Load” range from the three selections at the top of the chart; (0-50,000 Btu/hr) (60,000-100,000 Btu/hr) or (110,000-200,000 Btu/hr).
3. Choose a “System ΔT ” based on the minimum temperature drop of the system (20°F/30°F/40°F).

Follow the chosen column down the chart until it crosses the row of your desired boiler. This is the suggested buffer tank necessary to eliminate short-cycling and maintain efficiency.

Example: A CHN0991 boiler installed in a system with a minimum system load of 75,000 Btu/h and a system ΔT of 30°F, will need a RVU200 Buffer Tank.

	Model	0 - 50,000 Btu/HR			60,000 - 100,000 Btu/HR			110,000 - 200,000 Btu/HR		
		20° ΔT	30° ΔT	40° ΔT	20° ΔT	30° ΔT	40° ΔT	20° ΔT	30° ΔT	40° ΔT
	COPPER-FIN									
	CBN0495	RVU200	RVU200	RVU120	RVU200	RVU120	RVU120	RVU120	RVU120	—
	CBN0645	RVU400	RVU300	RVU200	RVU300	RVU200	RVU200	RVU300	RVU200	RVU120
	CBN0745	RVU400	RVU300	RVU200	RVU400	RVU300	RVU200	RVU300	RVU200	RVU200
	CBN0986	RVU750	RVU400	RVU300	RVU500	RVU400	RVU300	RVU500	RVU300	RVU200
	CBN1256	RVU750	RVU400	RVU300	RVU500	RVU400	RVU300	RVU500	RVU300	RVU200
	CBN1436	RVU750	RVU400	RVU300	RVU500	RVU400	RVU300	RVU500	RVU300	RVU200
	CBN1796	RVU1000	RVU750	RVU500	RVU750	RVU500	RVU400	RVU750	RVU500	RVU400
CBN2066	RVU1000	RVU750	RVU500	RVU750	RVU500	RVU400	RVU750	RVU500	RVU400	
	COPPER-FIN II									
	CHN401	RVU200	RVU120	RVU120	RVU120	RVU120	RVU120	RVU120	—	—
	CHN501	RVU200	RVU200	RVU120	RVU200	RVU120	RVU120	RVU120	RVU120	—
	CHN651	RVU200	RVU200	RVU120	RVU200	RVU120	RVU120	RVU120	RVU120	—
	CHN751	RVU200	RVU200	RVU120	RVU200	RVU120	RVU120	RVU120	RVU120	—
	CHN0991	RVU300	RVU200	RVU200	RVU300	RVU200	RVU120	RVU200	RVU120	RVU120
	CHN1261	RVU300	RVU200	RVU200	RVU300	RVU200	RVU120	RVU200	RVU120	RVU120
	CHN1441	RVU300	RVU200	RVU200	RVU300	RVU200	RVU120	RVU200	RVU120	RVU120
	CHN1801	RVU500	RVU300	RVU200	RVU400	RVU300	RVU200	RVU300	RVU200	RVU200
	CHN2071	RVU500	RVU300	RVU200	RVU400	RVU300	RVU200	RVU300	RVU200	RVU200
	POWER-FIN F9									
	POWER-FIN B9									
	PBN0502	RVU400	RVU300	RVU200	RVU400	RVU300	RVU200	RVU300	RVU200	RVU200
	PBN0752	RVU750	RVU400	RVU300	RVU750	RVU400	RVU300	RVU500	RVU400	RVU300
	PBN1002	RVU1000	RVU750	RVU400	RVU1000	RVU750	RVU400	RVU750	RVU500	RVU400
	PBN1302	RVU1000	RVU750	RVU750	RVU1000	RVU750	RVU750	RVU1000	RVU750	RVU500
	PBN1501	RVU750	RVU500	RVU400	RVU750	RVU500	RVU400	RVU750	RVU500	RVU400
	PBN1701	RVU1000	RVU750	RVU500	RVU1000	RVU750	RVU400	RVU750	RVU500	RVU400
	PBN2001	RVU1000	RVU750	RVU500	RVU1000	RVU750	RVU500	RVU1000	RVU750	RVU500
	F9 2:1 Turndown B9 On/Off									
	POWER-FIN M9									
	PBN0502	RVU120	RVU120	RVU120	—	—	—	—	—	—
	PBN0752	RVU120	RVU120	RVU120	RVU120	—	—	—	—	—
	PBN1002	RVU200	RVU120	RVU120	RVU120	RVU120	RVU120	RVU120	—	—
	PBN1302	RVU200	RVU200	RVU120	RVU200	RVU120	RVU120	RVU120	RVU120	RVU120
	PBN1501	RVU300	RVU200	RVU120	RVU200	RVU200	RVU120	RVU200	RVU120	RVU120
	PBN1701	RVU300	RVU200	RVU200	RVU300	RVU200	RVU120	RVU200	RVU120	RVU120
	PBN2001	RVU400	RVU300	RVU200	RVU300	RVU200	RVU200	RVU300	RVU200	RVU120
M9 5:1 Turndown										
	INTELLI-FIN									
	IBN1500	RVU400	RVU300	RVU200	RVU300	RVU200	RVU200	RVU300	RVU200	RVU120
	IBN1700	RVU400	RVU300	RVU200	RVU400	RVU300	RVU200	RVU300	RVU200	RVU200
	IBN2000	RVU500	RVU300	RVU300	RVU400	RVU300	RVU200	RVU400	RVU300	RVU200

Note: For applications outside the parameters listed above, please consult the Sizing Formula on the next page or use the “Buffer Tank Sizing Calculator” on our website www.lochinvar.com Click on Accessories, then Buffer Tank/Air Eliminator.

Buffer Tank Sizing Formula - Calculating Gallon Capacity

The recommended gallon capacity of Lochinvar Buffer Tanks is based on six parameters. These six parameters are used to derive the following formula and are explained below.

$$\frac{\text{Desired Run Time} \times (\text{Minimum Boiler Output} - \text{Minimum System Load})}{\text{System } \Delta T \times 8.33 \times 60}$$

Parameters:

- **Desired Run Time (Minutes)** – The desired amount of sustained firing time of each run cycle once a call for heat is detected. Lochinvar recommends a minimum run time of 10 minutes.
- **Minimum Boiler Output (Btu/h)** – The output of the boiler - based on that particular boiler's minimum firing rate which is determined by turndown ratio and efficiency. (For example: a PBN1501-M9 with 5:1 turndown ratio and 87% thermal efficiency will have a "Minimum Boiler Output" of 261,000 Btu/h.)
- **Minimum System Load (Btu/h)** – The load, or demand, placed on the system when the smallest possible appliance or zone has a call for heat. This value may vary greatly depending on the application and/or building design. The Project Design Engineer should be contacted to provide the exact value for this parameter.
- **System ΔT ($^{\circ}\text{F}$)** – The temperature drop across the system at minimum system load. Again, this value may vary greatly depending on the application and/or building design; therefore the Project Design Engineer should be contacted to provide the exact value for this parameter.
- **8.33 (Pounds)** – The accepted weight of one gallon of water. (Fixed value.)
- **60 (Minutes)** – The number of minutes in an hour. (Fixed value.)

Once you understand these parameters and how they relate and contribute to the sizing of a buffer tank, you will have no trouble sizing a Lochinvar buffer tank for any application or system.

Please use the following example of buffer tank sizing and selection as a guide.

Sizing Example: Calculate the Buffer Tank Gallon Capacity Using the Formula

$$\frac{\text{Desired Run Time} \times (\text{Minimum Boiler Output} - \text{Minimum System Load})}{\text{System } \Delta T \times 8.33 \times 60}$$

Use the following parameters to size a Buffer Tank:

IBN2000 (4:1 turndown and 97% thermal efficiency)

Minimum Boiler Output = 460,000 Btu/h

Minimum System Load = 100,000 Btu/h (Example only: actual System Loads may vary)

System ΔT = 40 $^{\circ}\text{F}$ (Example only: actual System ΔT 's may vary)

From the "Parameter" explanations, we know:

Desired Run Time = 10 minutes

One gallon of water = 8.33 pounds

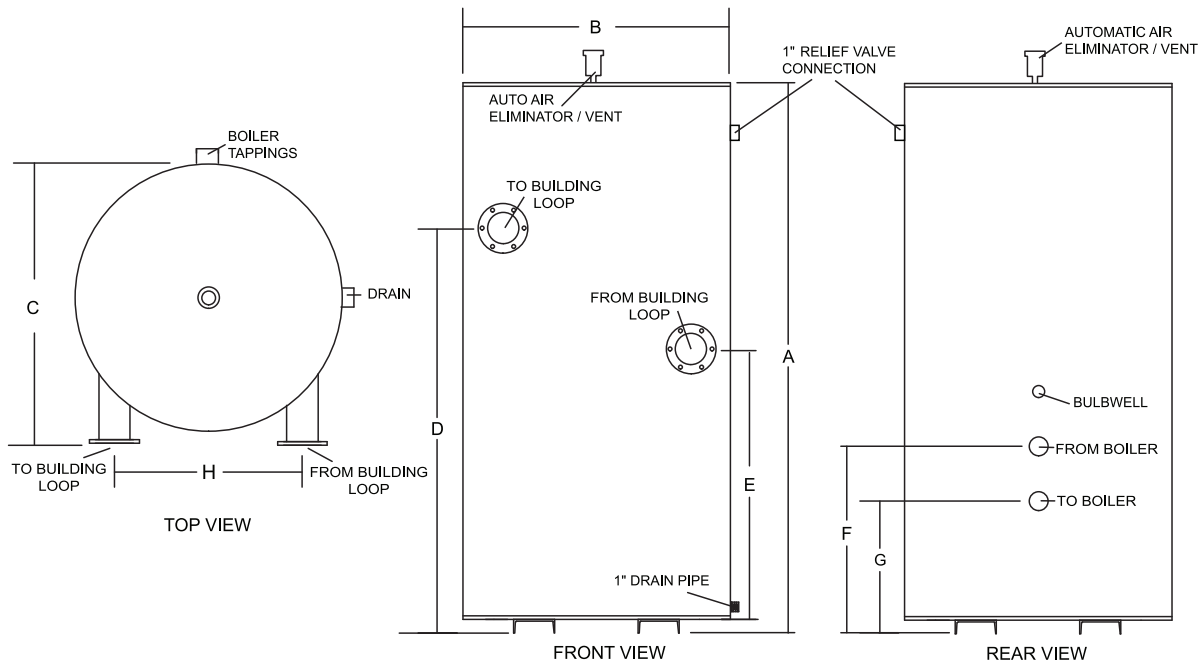
One Hour = 60 minutes

Using these six parameters, we can now calculate the gallon capacity of the Buffer Tank:

$$\frac{10 \times (460,000 - 100,000)}{40 \times 8.33 \times 60} = \frac{10 \times 360,000}{19,992} = \frac{3,600,000}{19,992} = 180 \text{ gallons}$$

Based on this calculation, we would recommend an **RVU200 Buffer Tank**.

Buffer Tank / Air Eliminator Dimensions & Specifications

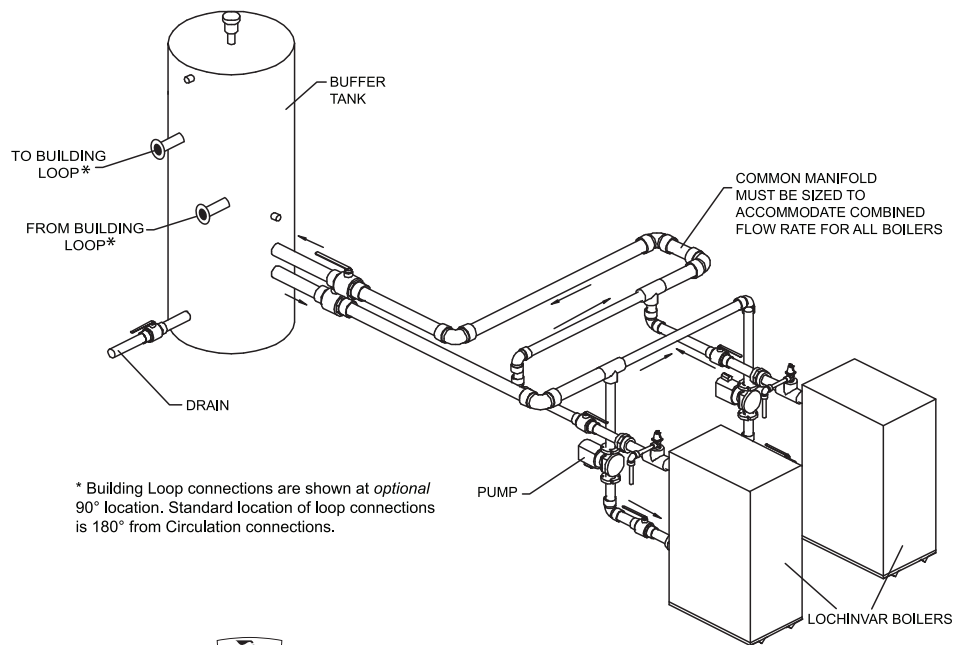


Model Number	Gallon Capacity	A	B	C	D	E	F	G	H	Supply/Return Connections	Boiler Tappings	Weight (lbs.)
RVU120	119	59"	32"	33-1/4"	42"	30"	25-1/2"	17-1/2"	20-1/2"	3" NPT	3" NPT	500
RVU200	200	89-1/2"	32"	33-1/4"	72-1/4"	60-1/4"	25-1/2"	17-1/2"	20-1/2"	3" NPT	3" NPT	900
RVU300	318	80"	40"	42"	57-1/2"	46-1/2"	27-1/2"	19-1/2"	27-1/2"	4" FL	3" NPT	1,290
RVU400	432	80"	46"	48"	56"	44"	29"	21"	31-1/2"	4" FL	3" NPT	1,626
RVU500	504	92"	46"	48"	67"	55"	29"	21"	31-1/2"	6" FL	3" NPT	1,765
RVU750	752	104"	52"	54"	76-1/2"	64-1/2"	31"	23"	33"	6" FL	3" NPT	2,330
RVU1000	940	128"	52"	54"	100-1/2"	88-1/2"	31"	23"	33"	6" FL	3" NPT	3,010

Notes: Custom Sizes and Configurations are Available. Consult Factory for details.

Additional Recirculation & Supply Return Connections Sizes Available. Consult Factory for details.

Typical Piping Arrangement for Buffer Tank / Air Eliminator in Boiler Systems



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