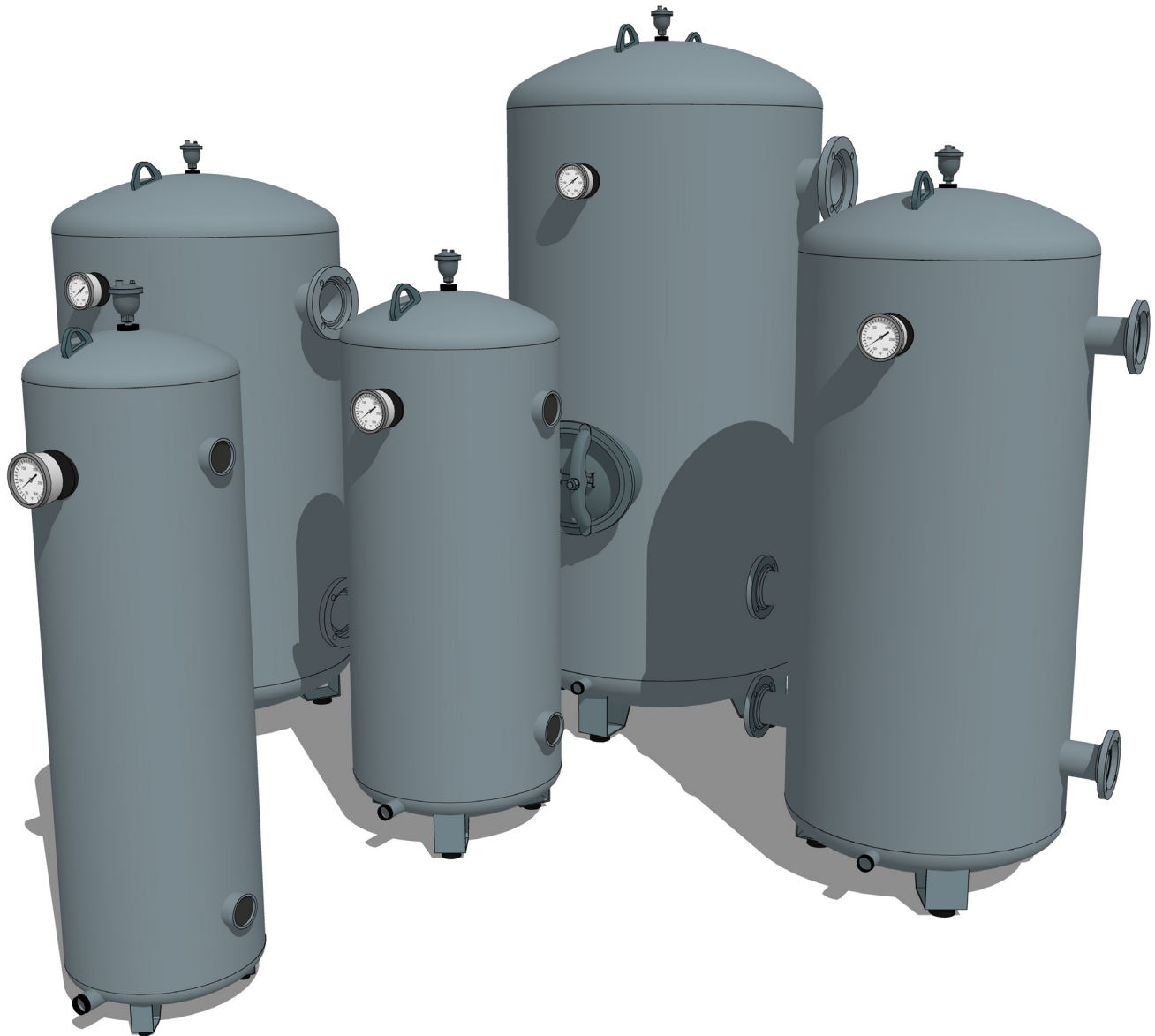


SEB Series



System Efficiency Buffer Tanks
Primary/Secondary Buffer Tank, Air Separator
Primary/Variable Buffer Tank



CEMLINE CORPORATION

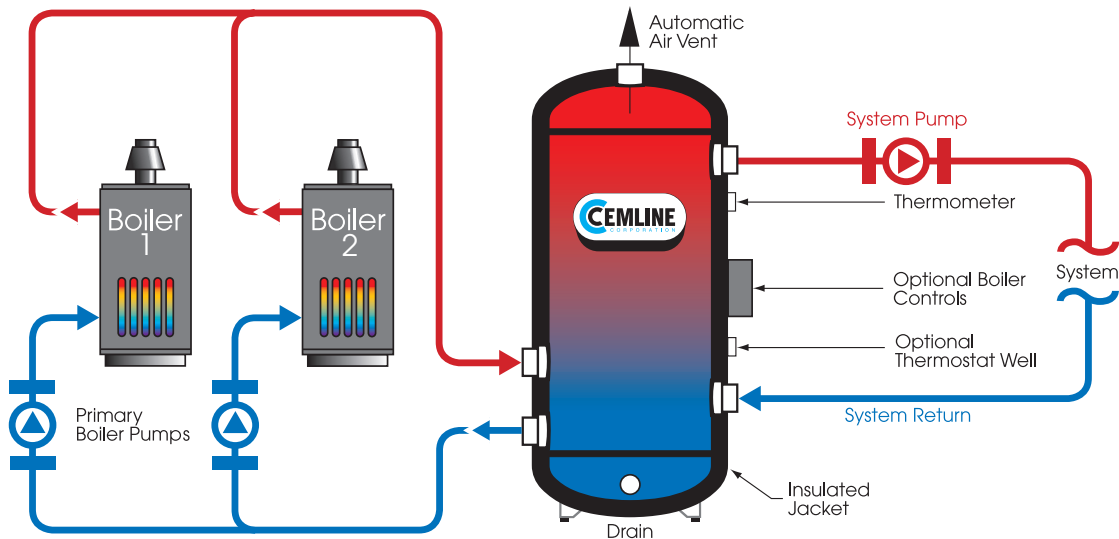
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Primary/Secondary Buffer Tank, Air Separator

- Improves Efficiency of the Heating System
- Eliminates the Need for an Air Separator
- Primary/Secondary Hydraulic Separator

Primary/Secondary Piping Arrangement



Cemline® primary/secondary buffer tanks improve system efficiency by preventing the problem of short cycling boiler(s).

Low water content boilers operating at low loads will short cycle leading to sooting, premature component failure, and nuisance shut downs. If the boiler is allowed to fire for a minimum of several minutes the full efficiency of the boiler can be achieved preventing sooting, premature component failure, and nuisance shut downs.

Boiler systems are sized to heat the building on the coldest days. When the outside temperature is above minimum outside design conditions the boiler may only require a short period of firing to warm the building causing short cycling of the boiler. Installing a Primary/Secondary buffer tank prevents this short cycling. Many boiler manufactures do not recommend firing the boiler(s) more than 6 cycles per hour.

Cemline primary/secondary buffer tanks remove air from the heating system, thus eliminating a separate air separator.

Boiler systems require a low velocity area in the system to allow entrained air to be separated from the boiler water. A Primary/ Secondary Buffer tank will have extremely low velocity and is used as the air separator, thus eliminating the need for a separate air separator.

Cemline primary/secondary buffer tanks act as a hydraulic separator by separating the primary and secondary sides of the boiler system.

The primary/secondary hydraulic separator allows for variable volume systems to operate with the modern boiler as instructed in ASHRAE 90.1.

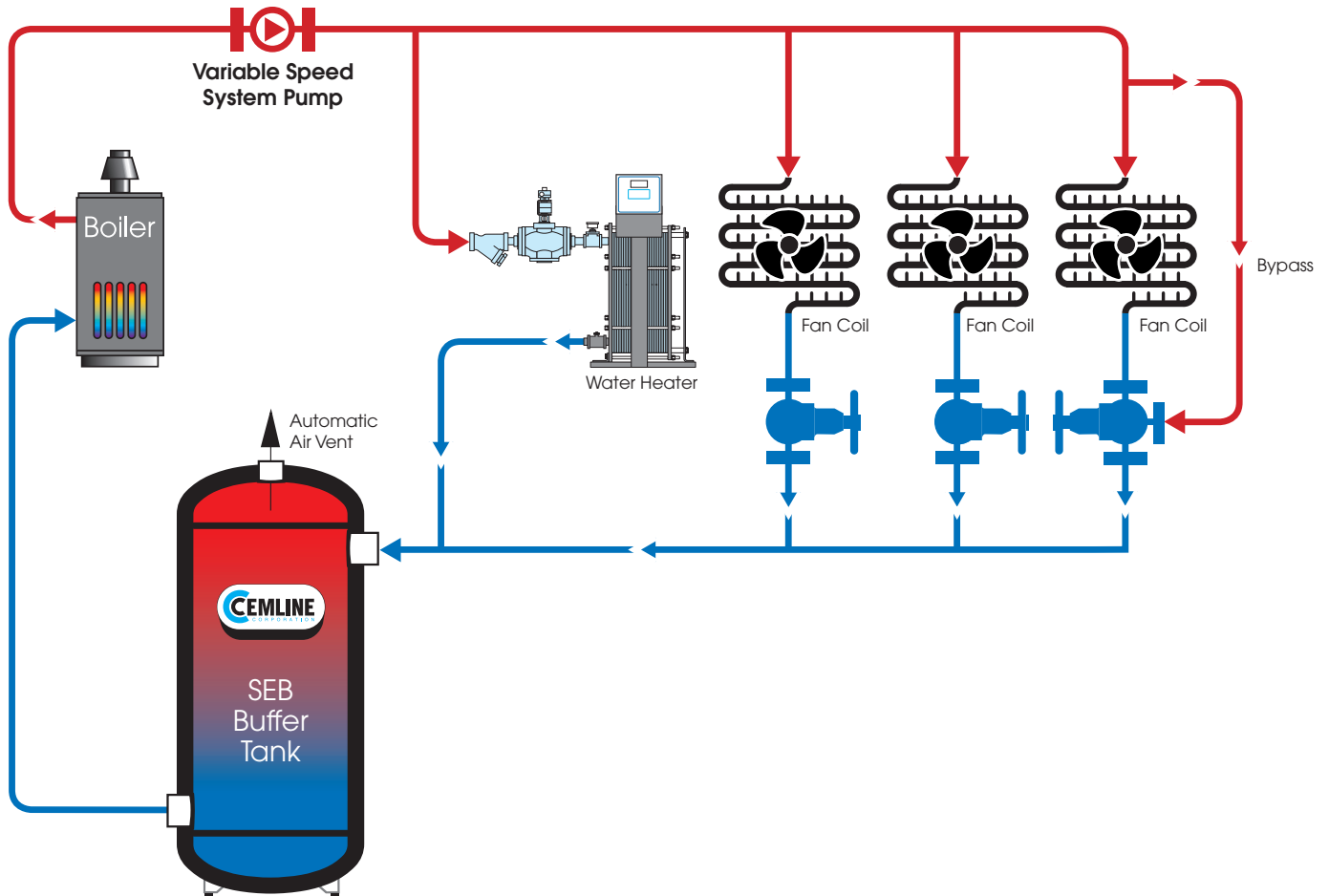
Cemline Primary/Secondary buffer tanks come complete with insulated jackets (R-12.5) with Velcro closures for simple field installation.

Cemline Primary/Secondary buffer tanks have a well to accept Building automation system or customer supplied temperature sensors. As an option a factory supplied digital electronic thermostat can be supplied to cycle the boilers on call for heat. This digital electronic thermostat has a LCD temperature display and can be easily field programmed for a minimum of 2°F and maximum of 30°F temperature differences.

Primary /Variable Buffer Tank, Air Separator

- *Improves Efficiency of the Heating System*
- *Air Venting Capabilities*

Primary/Variable Piping Arrangement



Cemline System Efficiency Buffer Tanks improve system efficiency by preventing the problem of short cycling boiler(s).

The System Efficiency Buffer Tank can also be used in a primary variable piping system to prevent short cycling. When used in a Primary Variable System only two ports are used and two ports are plugged. In this application, low water content boilers operating at low loads will short cycle leading to sooting, premature component failure, and nuisance shut downs. If the boiler is allowed to fire for a minimum of several minutes the full efficiency of the boiler

can be achieved preventing sooting, premature component failure, and nuisance shut downs. In a primary variable system stratification in the buffer tank is important to extend the boiler cycle on-time. This stratified vertical tank has the hotter water at the top and the cooler water at the bottom. By pulling water from the bottom of the tank the cooler water is returned to the boiler allowing the run longer preventing short cycling.

Boiler systems are sized to heat the building on the coldest days. When the outside temperature is above minimum outside design conditions the boiler may only require a short period of firing to warm the building causing short cycling of the boiler. Installing a System Efficiency Buffer tank prevents this short cycling. Many boiler manufacturers do not recommend firing the boiler(s) more than 6 cycles per hour.

Operation of the Primary/Secondary Buffer Tanks

The boiler(s) will have a pump to provide constant flow rate between the Primary/Secondary buffer tank and the boiler. The top of the Primary/ Secondary buffer tank is domed and an automatic air vent is installed in the top of the crown of the dome. There is a secondary building system pump, which circulates hot water from the Primary/Secondary

buffer tank to the system and returns the system water to the Primary/ Secondary buffer tank. Typically the maximum tank temperature is 180°F. A digital thermostat can be programmed to allow the Primary/ Secondary buffer tank temperature to drop 5 to 10 degrees before calling for the primary boiler pump to start and for boiler(s) to fire. When the tempera-

ture of the Primary/ Secondary buffer tank temperature reaches 180°F the boiler stops firing and the primary boiler pump stops. The secondary pump continues to run to provide heating water to the building.

Product Benefits

- Improves efficiency of the Heating System
- Eliminates the need for an Air Separator
- Primary/Secondary Hydraulic Separator

Standard Equipment

- A.S.M.E. Pressure Vessel – rated 125 psig @ 400°F built to A.S.M.E. Section VIII, Division I
- Air Vent – Reduces air accumulation in the system.
- Insulated Jacket – Foam R-12.5 field installed insulation with removable jacket
- Thermometer – Temperature in the buffer tank displayed

Optional Equipment

- Digital Electronic Field Programmable Thermostat
- Extra Openings
- Inlet/Outlet Diverting Baffle(s)
- Stainless Steel Vessel

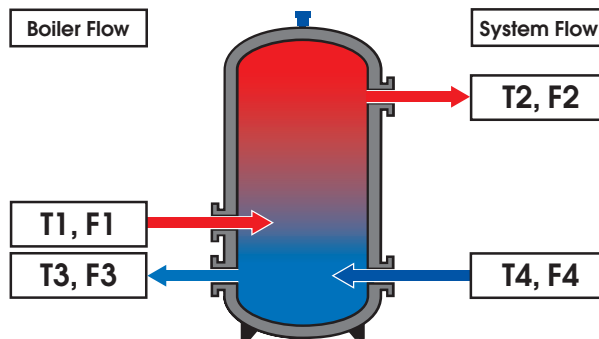
How to Calculate Required SEB Tank

Step 1: Determine the flow system characteristics. (continued on page 6)

Primary/secondary systems can have varying flow characteristics depending on how the system is designed and how it operates.

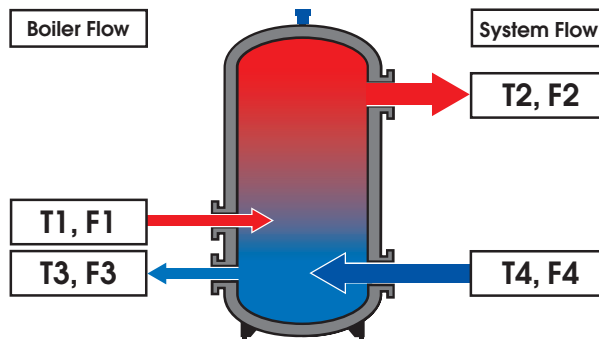
Boiler Flow = System Flow

System Type 1: System Flow equals Boiler Flow. (No Buffer Tank Required). The distribution flow and the boiler flow are equal. This is the least common occurrence.



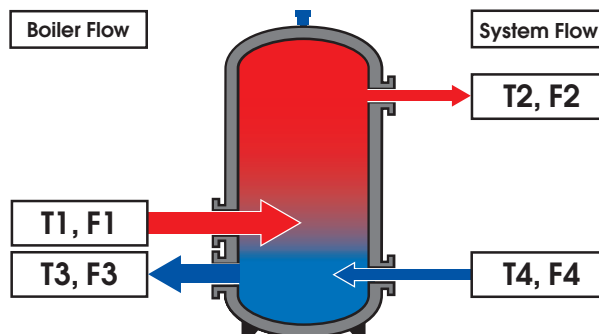
Boiler Flow < System Flow

System Type 2: System Flow greater than Boiler Flow. (No Buffer Tank Required). The system flow is greater than the boiler flow. The greater system flow creates a situation where the temperature to the system piping is blended and less than the temperature from the boiler.



Boiler Flow > System Flow

System Type 3: System Flow less than Boiler Flow. (Buffer Tank Required). The system flow is less than the boiler flow. The greater boiler flow creates a situation where the temperature returning to the boiler is greater than the cold water returning from the system piping.



How to Calculate Required SEB Tank (continued)

Automated sizing can be found on-line at www.cemline.com. Please visit www.cemline.com to size and print out specification and drawing of the unit required.

Step 2: What is the BTU/hr of the boiler?

Q Boiler (BTU/H)

Step 3: What is the minimum boiler output in BTU/hr?

Q mBoiler = Q Boiler x Minimum Firing Rate
Boiler Minimum Firing Rate between 20-80%*

*Check with boiler manufacturer for recommended minimum firing rate.

Step 4: What is the minimum rate of heat extraction from the tank in BTU/Hr.

Q Load†

†Assume to be 0 if no load on the system or if the rate is unknown.

Step 5: Enter the temperature drop within the tank.

ΔT (°F) (Typically, 10°F, Range 5 to 25°F)

Step 6: Enter the cycle time the boiler should run.

T (Minutes) (Range: 1—5 minutes)*

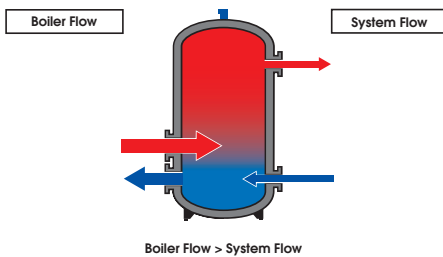
*Check with boiler manufacturer for recommended minimum run time.

Step 7: Calculate the minimum buffer tank size required.

$$V \text{ (Gallons)} = \frac{T \times (Q \text{ mBoiler} - Q \text{ Load})}{\Delta T \times 500^\dagger}$$

†500 = 8.33#/gal x 60 min/hr

Example: Buffer Tank Sizing



Step 1: System flow is less than boiler flow.

Step 2: What is the BTU/hr of the boiler?

1,000,000 BTU/hr

Step 3: Calculate the minimum boiler output in BTU/Hr.

The boiler has a minimum firing rate of 25%.

1,000,000 BTU/hr x 25% = 250,000 BTU/hr

Step 4: What is the minimum rate of heat extraction from the tank?

0 BTU/hr

Step 5: Temperature drop in the tank.

$\Delta T = 10$ °F

Step 6: Cycle time on.

T = 2 minutes

Step 7: Minimum buffer tank volume required (V).

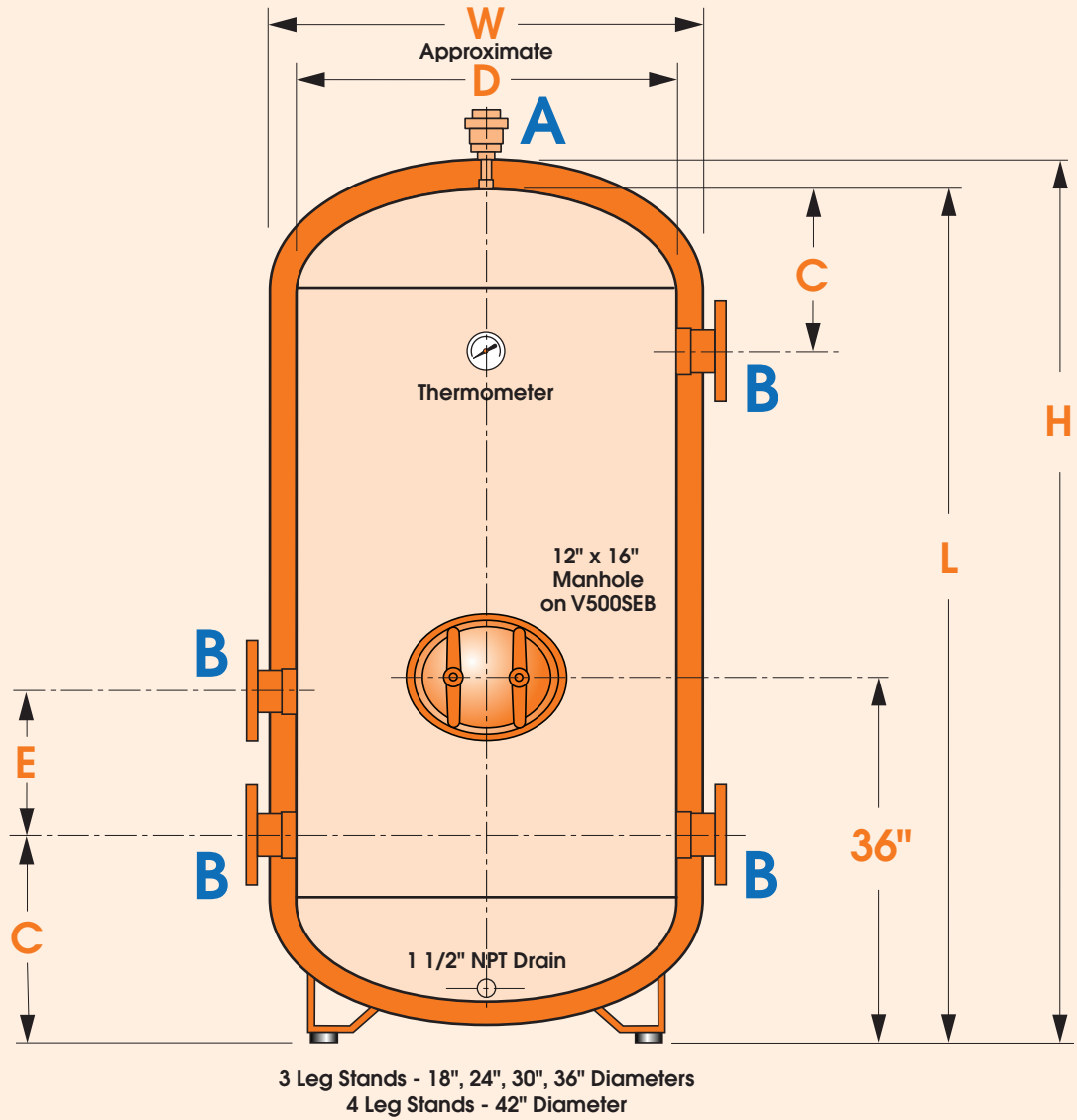
$$V \text{ (Gallons)} = \frac{T \times (Q \text{ mBoiler} - Q \text{ Load})}{(\Delta T \times 500)}$$

$$V = \frac{2 \times (250,000 - 0)}{(10 \times 500)}$$

$$V = 100 \text{ gallons}$$

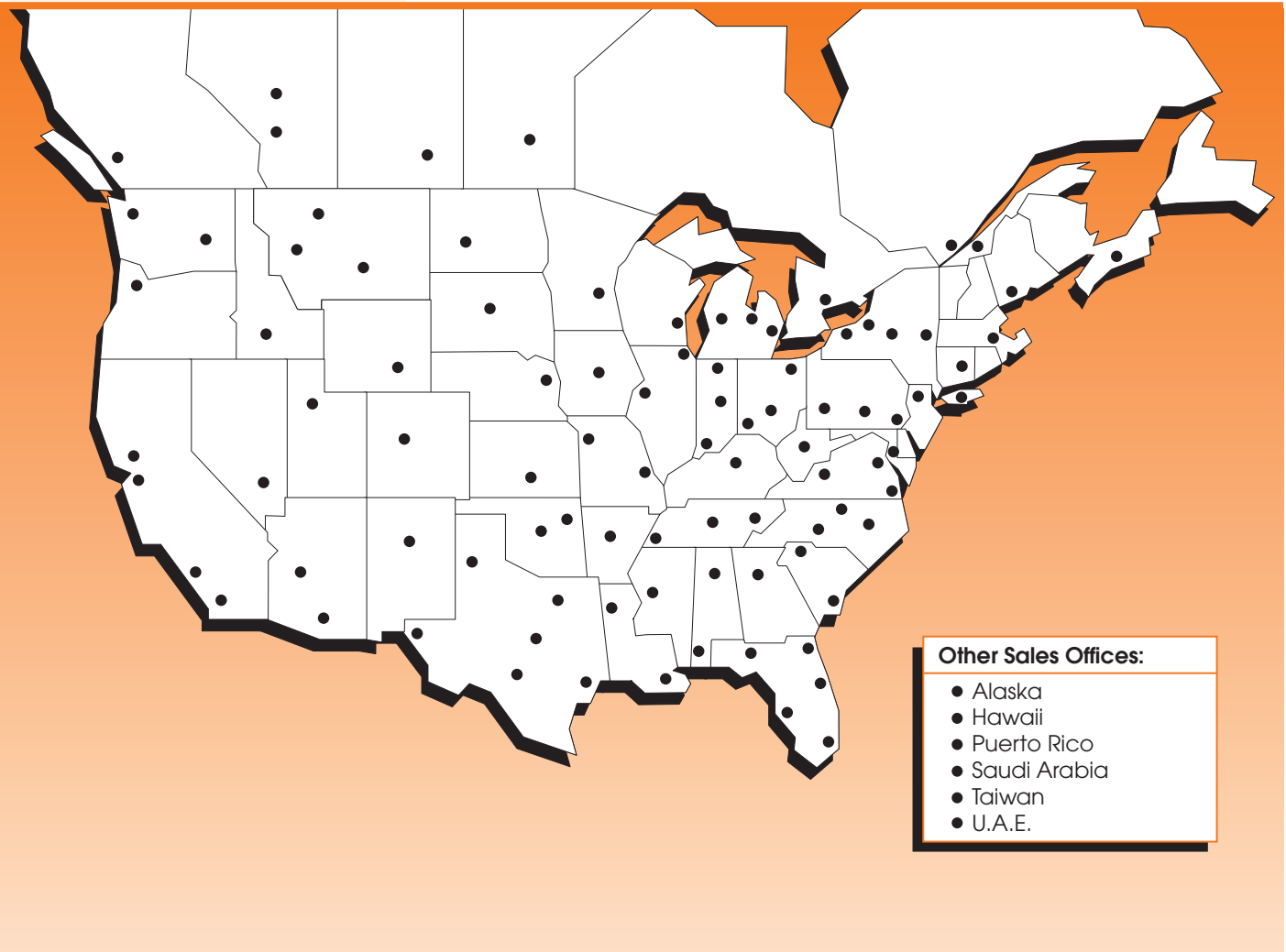
Therefore, choose a V120SEB.

System Efficiency Buffer Tank- Submittal Drawing



Model Number	Capacity Gallons	D	L	A	B	C	E	H	W
V60SEB	60	18"	61"	3/4 Vent"	2" NPT	10"	10"	64 1/8"	24 1/4"
V120SEB	120	24"	60"	3/4 Vent"	2 1/2" NPT	12"	12"	63 1/8"	30 1/4"
V200SEB	200	30"	72"	3/4 Vent"	3"-150# FLG	14"	14"	75 1/8"	36 1/4"
V300SEB	300	36"	72"	3/4 Vent"	4"-150# FLG	16"	16"	75 1/8"	42 1/4"
V500SEB	500	42"	90"	3/4 Vent"	6"-150# FLG	18"	24"	93 1/8"	48 1/4"

SEB Series



- Other Sales Offices:**
- Alaska
 - Hawaii
 - Puerto Rico
 - Saudi Arabia
 - Taiwan
 - U.A.E.

Available Cemline Brochures



- www.cemline.com
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 - Brochures
 - I.O.M. Manuals
 - Drawings & Specifications
 - Agent Locator
 - Plant Tour

- STONESTEEL®
 - Water Storage Tanks
 - Jacketed Storage Tanks
 - Commercial Electric and Packaged Copper Coil Water Heaters
- Submerged Heating Coils
- Replacement Tube Bundles
- Steel Tanks
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- System Efficiency Buffer Tanks
- Electric Boilers
- Stainless Compact Packaged Copper Coil Water Heaters - Semi-instantaneous, Instantaneous
- Unfired Steam Generators
- Condensed Catalog

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