



**SHIPPENSBURG PUMP CO. INC.**

P.O. BOX 279, SHIPPENSBURG, PA 17257

PH 717-532-7321 • FAX 717-532-7704

WWW.SHIPCOPUMPS.COM

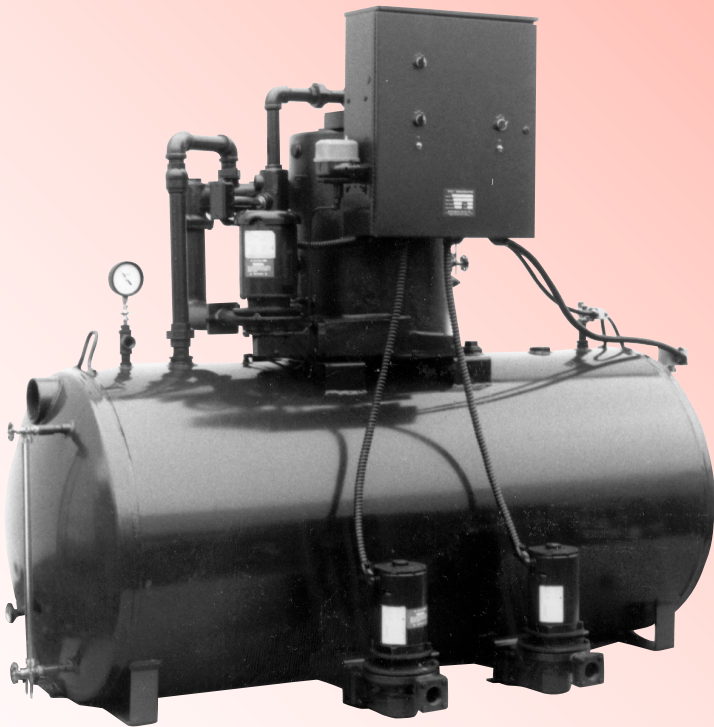
**Pride**

**Quality**

**Craftsmanship**

**BULLETIN 135**

*Revised 6/18*



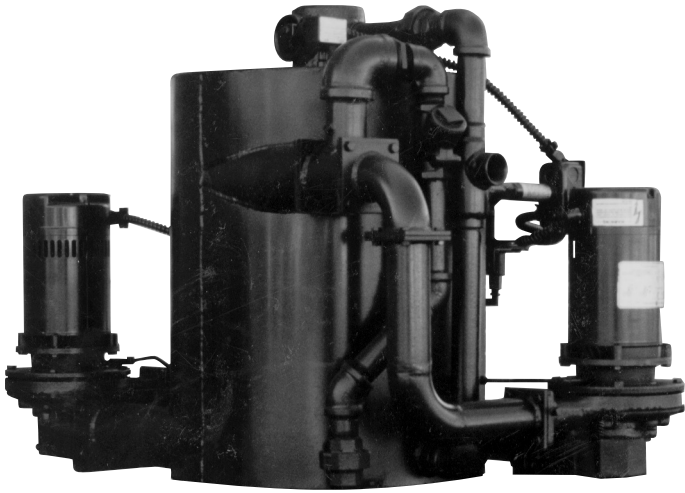
**TYPE SHVC**  
**STEEL HORIZONTAL**  
**VACUUM CONDENSATE**

*Maintain a constant  
system vacuum*

**SHIPCO®**  
**PUMPS** are equipped with Mechanical Seals rated up to a standard 250°F.  
*Higher temperature seals and special faces available upon request.*

## SIZING VACUUM PUMPS

Vacuum pumps are normally sized based on a systems rating in sq. ft. EDR; for systems up to a nominal size of 10,000 sq. ft. EDR the vacuum design is normally .5 CFM per 1,000 sq. ft. EDR.



The sizing recommended above should be used for well-maintained systems that are in good operating condition.

In systems where some leaks may be found or steam vacuum pumps are being replaced we recommend sizing the vacuum pumps at 1 CFM/1000 sq. ft. EDR and installing a full duplex system for double capacity.

**Our illustration shows** the integral parts and design configuration of the SHIPCO® vacuum producer. The vacuum chamber requires a cold water connection to the automatic make-up valve. This assures a constant level of water in the vacuum producer for optimum performance.

Water is pumped from the circular chamber to the nozzle by the centrifugal pump.

High velocity water going through the multiple nozzle entrains air at the vacuum and compresses it in the ejector.

It then reenters the circular chamber where the air (green arrows) is separated from the water (black arrows) which recirculates to the pump.

**EXAMPLE:** A 5,000 sq. ft. system would require what size vacuum pump?

$$.5 \text{ CFM}/1000 \text{ sq. ft. EDR} \times 5000 \text{ sq. ft. EDR} = .5 \text{ CFM} \times 5 = 2.5 \text{ CFM}$$

For systems larger than 10,000 sq. ft. EDR the vacuum design is normally .3 CFM per 1,000 sq. ft. EDR.

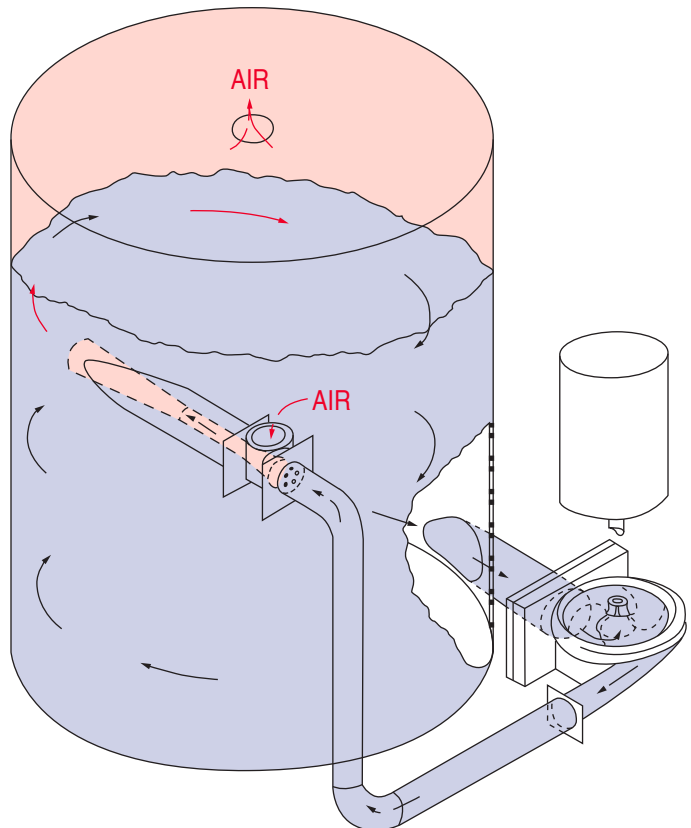
**EXAMPLE:** A 20,000 sq. ft. system would require what size vacuum pump?

$$.3 \text{ CFM}/1000 \text{ sq. ft. EDR} \times 20,000 \text{ sq. ft. EDR} = .3 \text{ CFM} \times 20 = 6 \text{ CFM}$$

**NOTE:** Where excessive leaks are prevalent and traps are not repaired it may be impossible to produce a vacuum until the system is repaired and tightened up.

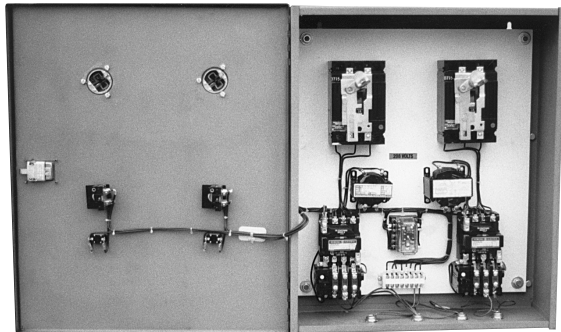
### Operating Range:

The normal operating range for the vacuum pumps is a range from 3" Hg to 8" Hg. SHIPCO®'s rating for its pumps is at 5½" Hg 160°F.



**Type SHVC Vacuum Condensate Return Units** are available for larger volumes of condensate. These units may be customized to meet specific design requirements of a particular installation. The quantity of pumps and controls may be custom engineered as required.

**SHVC Receivers** are fabricated from 3/16" tk to 3/8" tk black steel, with flanged and dished heads. Standard features include: inlet, drain, vent, overflow and pump suction connections. Accessories include dial thermometer, gauge glass, vacuum switches, hurling water float switch, solenoid valve, compound gauge, inlet strainer and control panel. Optional receiver materials are available in heavier thicknesses of black steel. 300 Series Stainless Steel receivers are available for corrosion resistance.



**Electrical Control Panels:** An integral part of the SHVC Unit is the electrical control panel. The panel can be factory mounted and wired to NEMA and J.I.C. specifications for various duties. Our standard wiring allows for independent pump operation. Internal wiring is numbered to match the corresponding wiring diagram for identification and service.

**Magnetic Starters** are required for all three phase motors. Our standard starter includes 3 leg overload protection. Single phase motors up to and including 1 HP have built-in thermal overload protection and do not require magnetic starters. Single phase motors larger than 1 HP usually do not have built-in thermal overload protection and require magnetic starters. Combination magnetic starter and disconnect options are available to meet code and servicing requirements.

Pump control and alternation: SHVC Units are designed to control the pumps by the level of the condensate in the receiver.

Standard units utilize 2 float switches to start and stop the pumps.

*Option 1:* Substitute 1 automatic mechanical alternator in place of the 2 float switches. The mechanical alternator will start and stop both pumps on a duplex unit. It will alternate the pumps on each duty cycle. In the event of extreme load conditions the alternator will also operate both pumps simultaneously for high level conditions.

*Option 2:* Utilizing the 2 standard float switches. Install 2 lead-off lag selector switches in the electrical control panel. These switches allow you to manually select the lead and lag pumps. The duty cycle can manually be reversed on a predetermined schedule for even wear.

*Option 3:* Utilizing the 2 standard float switches. Install an electrical alternator in the electrical control panel. The electric alternator will alternate the pumps on each duty cycle. In the event of extreme load conditions the second float switch will start the second pump. Both pumps will then operate simultaneously until the level recedes.

**Recommended Receiver Sizes and Pump Capacities:** The normal condensing rate of a steam heating system is .5 GPM per 1000 sq. ft. EDR. This rate may be slightly higher at start-up; however, by experience, sizing the flow rate of the condensate pump at twice the normal condensing rate delivers adequate capacity at start-up and efficient operation under normal loads. By using the Table of Heat and Power you can easily convert from one unit of measure to GPM.

**Table — Values of Heat and Power**

	GPM	BTU	Lbs/Hr	Sq. Ft. EDR
1 Boiler HP	.069	33,475	34.5	139.4
1,000 sq. ft. EDR	.50	240,000	247.3	1,000

**Unit designation as follows:**

RECEIVER/GALS.	UNIT TYPE	GPM	PSIG

Example:

196	SHVC	150	30
-----	------	-----	----

196 GALLON RECEIVER, WITH PUMPS RATED 150 GPM @ 30 PSIG.

By knowing the flow rate of the condensate being produced from the system load, you calculate the pumping rate by multiplying it by 2.

ex: 30,000 lbs. per hr. x .002 GPM/lb. per hr. = 60 GPM.

thus the pumping rate should be 60 GPM x 2 or 120 GPM.

**Sizing the receiver:** Condensate receivers are sized to collect and hold the return condensate for approximately 1 to 2 minutes. The pumps should run approximately 1 minute on each duty cycle. In our example the pump is sized for 120 GPM. Checking the receiver table for net storage capacity we would select a \_\_\_\_\_ x \_\_\_\_\_ receiver with \_\_\_\_\_ gallons of net storage.

## QUICK SELECTION TABLE – VACUUM PUMP

Air Capacity for single units rated in CFM

	HG. 5-1/2" @ 160°F	HG. 10" @ 70°F	HG. 15" @ 70°F	MOTOR HP	MOTOR RPM
<b>C F M</b>  <b>Cubic Feet Per Min</b>	6	5.8	3.5	3/4	3500
	6	5.8	3.5	3/4	3500
	8.5	8.5	5.5	1	3500
	8.5	8.5	5.5	1	3500
	12	12	9	1-1/2	3500
	18	18	16	2	3500
	18	18	16	2	1750
	32	32	20	3	3500
	32	32	23	3	1750
	52	52	42	5	3500
	52	52	44	5	1750
	74	74	62	7-1/2	1750
103	103	85	10	1750	

## SHVC STANDARD RECEIVER SIZES

SIZE	GALLONS
24 x 36	77
24 x 48	100
24 x 60	124
30 x 48	162
30 x 60	196
30 x 72	235
36 x 60	287
36 x 72	344
36 x 84	400
42 x 72	472
42 x 84	550
42 x 96	614
48 x 84	716
48 x 96	819

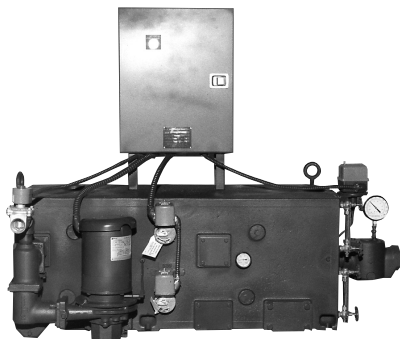
Receivers are offered in welded black steel as standard. The receivers are also available in 300 Series Stainless Steel for long corrosion resistance. We recommend the receivers be sized for at least 10-minute storage capacity based on the boiler evaporation rate.

## WATER PUMP CAPACITIES

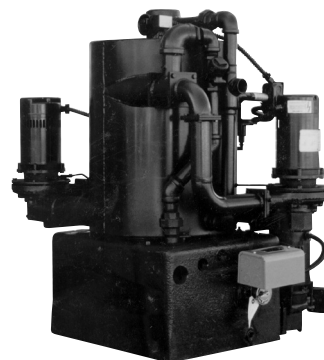
NOTE: Table below shows capacities from up to 10" Hg Model D Pumps

FT. TDH	PSIG	MAXIMUM CAPACITIES AT MOTOR HP (3500 RPM) and APPLICABLE DISCHARGE PRESSURE									
103.95	45						15 117	30 117	45 117	112-1/2 114	GPM Pump Type
80.85	35					15 116	30 116	45 117	60 127	112-1/2 114	GPM Pump Type
69.3	30					18 116	30 116	45 117	75 114	112-1/2 114	GPM Pump Type
57.75	25				22-1/2 116	30 116	45 116		112-1/2 114		GPM Pump Type
46.2	20		18 110	30 116	37-1/2 116	45 116	60 113	112-1/2 114			GPM Pump Type
34.65	15	18 110	22-1/2 110	30 110	37-1/2 116	45 116	60 113	112-1/2 114			GPM Pump Type
23.1	10	22-1/2 110	30 110			45 116		112-1/2 114			GPM Pump Type
<b>MOTOR HP</b>		1/3	1/2	3/4	1	1 1/2	2	3	5		

## OTHER PRODUCTS



**TYPE LRV**  
Low Return Vacuum  
Condensate Pumps



**TYPE BVC**  
Vacuum and Condensate Pumps  
with Cast Iron Condensate Receivers