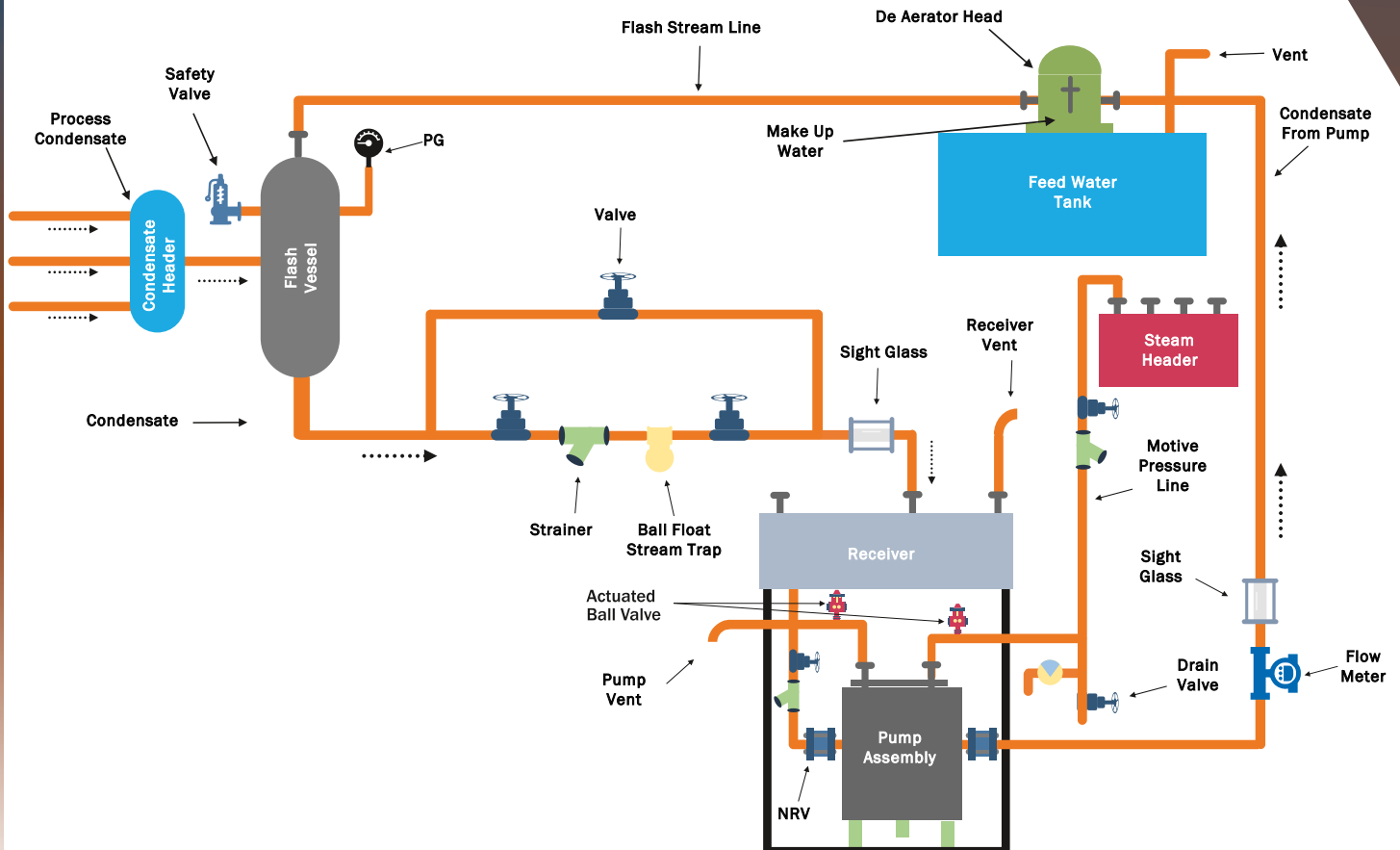




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# AIR OPERATED ELECTRONIC CONDENSATE RECOVERY SYSTEM

Air operated pressure powered pump is an ideal choice for condensate recovery. Recovering condensate is recovering energy and water.

## OVERVIEW

Condensate recovery is a means to reuse the water and sensible heat contained in the discharged condensate. Reusing hot condensate instead of discarding, can lead to substantial savings in energy and water resources, as well as improve working conditions and reduce the plant's carbon footprint.

One of the ideal ways to recover the condensate is through pressurized systems.

In a pressurized condensate recovery system, recovered condensate is maintained above atmospheric pressure all the way through the recovery process. The pressurized condensate is normally used as boiler make-up water. Since any associated flash or live steam is pressurized, this steam can be recovered for reuse in applications such as waste heat steam generators and cascade systems.

## BENEFITS OF “EPOCRS”

- Every 6 degrees increase in boiler feed water temperature results in 1% reduction in fuel consumption
- Oxygen content at 100oC is almost nil.
- Increase in boiler life-No Oxidation-No Corrosion-No Chocking of boiler tubes-Low Maintenance of Boiler -Capacity of Boiler remains same even after prolong use
- Low maintenance cost
- Additional Flash steam recovery can result in 7% saving of steam from the condensate

## PAYBACK PERIOD

### We recover sensible heat by recovering hot condensate

For example If we take a case where feed water is heated from 40 to 90 degrees . Consider Condensate load of 6000 kg/hr.

Fuel taken as Rice Husk having a calorific value of 3500 Kcal/Kg and Boiler with an efficiency of 80%. Then the fuel saved (Q) will be

$$Q = 6000 \times 50 / (3500 \times 0.8) = 107 \text{ Kg/hr of fuel}$$

Considering fuel cost to be Rs.3 per Kg it becomes a saving of Rs. 321 per/hr. In just 600 hours of running, we can save Rs.1,92,600.00

### We recover latent heat by recovering Flash Steam

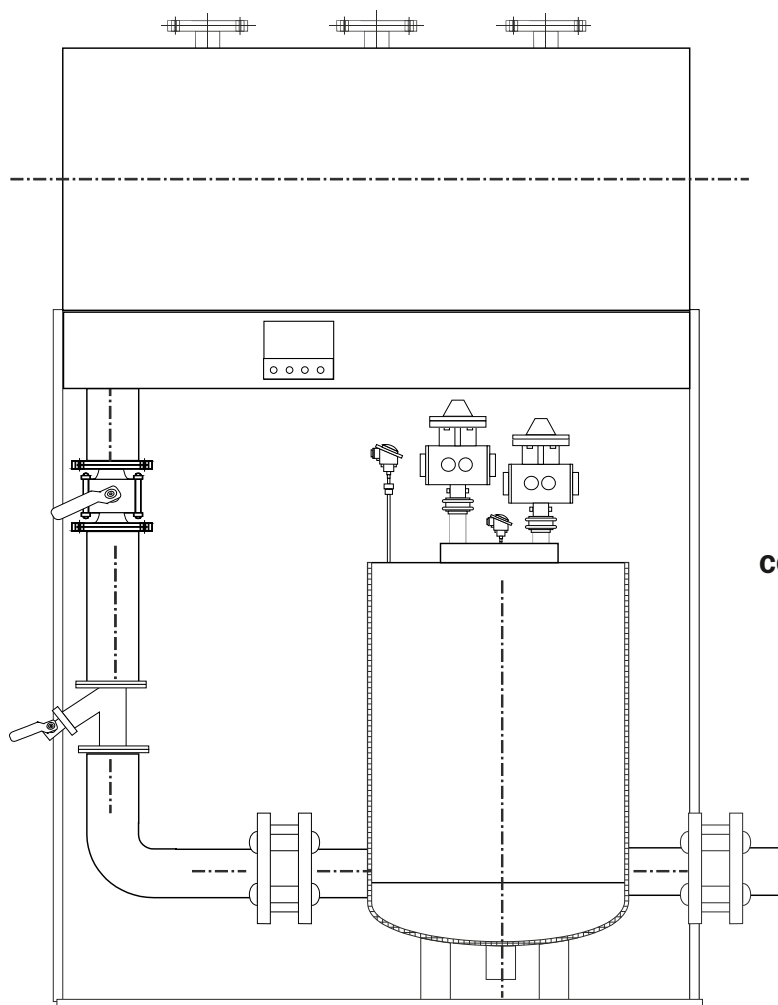
Considering just 6% as recoverable Flash steam . Savings can be:

$$6\% \text{ of } 6000 = 360 \text{ kg/hr.}$$

$$\text{Latent heat} \times \text{Qty of Flash Steam} = 194400 \text{ Kcal/kg}$$

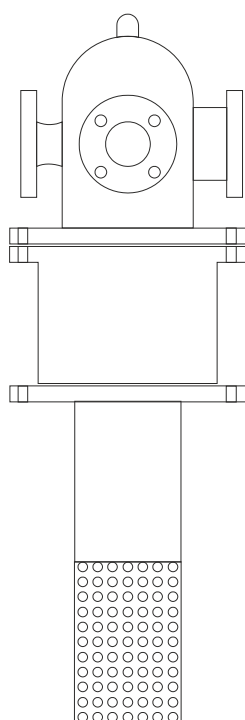
## ADVANTAGE OF ELECTRIC FLOAT SWITCH ASSEMBLY

Sr	Mechanical float assembly	Electric float switch assembly
01	Moving particles with close tolerance & friction <ol style="list-style-type: none"><li>1. Float</li><li>2. Spring</li><li>3. Shaft</li><li>4. Pin</li><li>5. Spring retainer</li><li>6. Motive pressure valve</li><li>7. Air vent valve</li><li>8. Retainer valve</li></ol>	Float with 1 mm clearance
02	There are 8 moving parts in this system which is susceptible to rust, wear and tear hence it leads to a higher maintenance.	With only 1 moving part the maintenance of this system is very low.
03	Higher chance of breakdown.	Minimum chances of breakdown.
04	Foreign particle and dust block the pump stop the pump.	1 mm clearance between float and the shaft gives smooth and trouble free operation.
05	High friction reduces the life of parts.	Low friction because of 1mm gap between the float and the shaft gives longer life.
06	Frequency of float damage due to water hammer is very high because the float is hollow.	Compact module negates the water hammer effects.
07	Capacity : 3000 LPH	Capacity : 4500 LPH

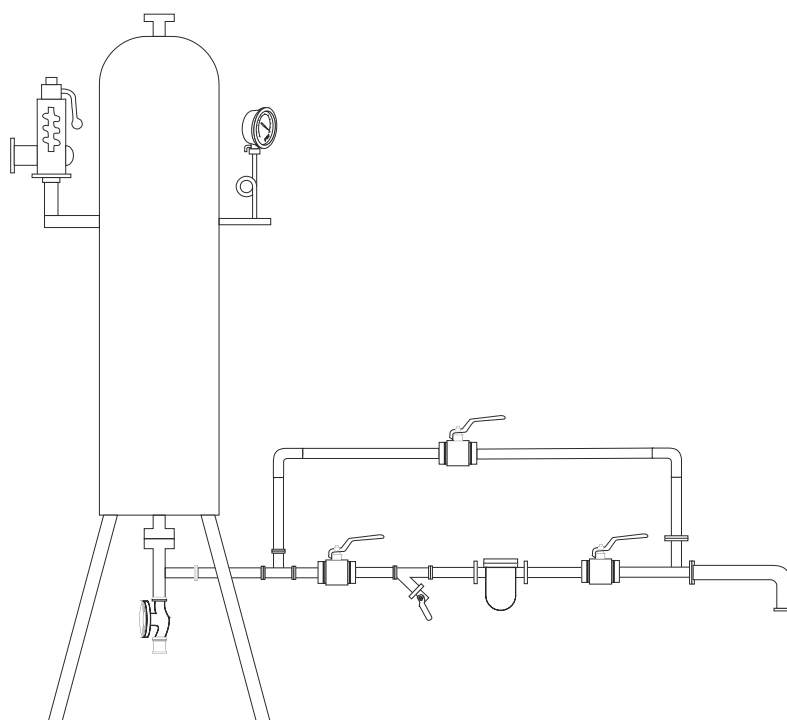


**CONDENSATE RECOVERY SYSTEM**

**DEAERATOR HEAD**



**FLASH VESSEL**



## ELECTRC POWER PUMP UNIT

### Working Principle

- Utilizes Motive pressure
- 1 kg/cm pressure will give a lift of 10 meters height
- Condensate from various process line comes to inlet header
- From inlet header it comes to high capacity Flash Vessel where flashing takes place. Flash steam being lighter goes to the top and condensate gets collected at the bottom
- Flash steam is recovered and fed to boiler feed water tank
- Condensate from flash vessel goes to unique perfect module.

### Consisting of

- Strainer
- High capacity ball float steam trap
- By – pass useful when pressure drops drastically and for cleaning
- Sight glass for visual monitoring
- Condensate gets collected in high capacity Receiver from where it goes to main pump body via valve strainer and NRV
- As the condensate level increases in the pump body float gets lifted triggering the closure of Pump vent and opening of the Motive pressure into the pump body.
- As motive pressure enters, due to the pressure it carries the collected Condensate from the Pump to Boiler feed water Tank.
- When the tank empties, float comes down closing the motive Pressure and opening the Pump Vent.
- Cycle repeats

Example for sizing and selection of pressure pump unit.

If you are required to select a suitable pressure pump unit, proceed as follows:

Condensate to be handled	: 2000LPH
Motive air pressure available	: 5 Kg/cm <sup>2</sup> g
Delivery head	: 6 mtrs
Frictional losses in horizontal distance	: 4 mtrs
Pressure in the line where condensate is being returned	
Above pressure in liquid column	: 10 mtrs
Total head against which pump must operate	: 20 mtrs
Now look at the table given on the left-hand side	
Select 5 Kg/cm <sup>2</sup> g motive pressure line	
Pick up 20 mtr delivery headline	
Select pump unit size that gives flow rate in excess of required.	

If the unit in example given above has only 150 mm as the filling head.

The capacity from above table will have to corrected from the data on the left side here

Capacity derating factor for 0.15m fill head	: 0.7
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Pump unit capacity of selected model	: 2600LPH
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Capacity after derating for fill head	: 1820LPH
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**You may have to choose a unit of higher size in this case**

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