

## What Benefit can I Expect ?

- ✓ Saving in fuel as feed water temperature is increased (6°C rise = 1% increase in boiler efficiency)
- ✓ Saving in fuel as blowdown loss is reduced
- ✓ Saving of water treatment chemicals and processes
- ✓ Saving of the water itself
- ✓ Saving in Power when replacing electrical pump

## Sizing and Selecting the correct condensate pump

The Steamline CRPS is selected based on the following:

- ▶ The motive pressure of steam available
- ▶ The condensate load, given or calculated
- ▶ Total back pressure on the outlet side against which the pump has to lift

Out of these, we have to basically only calculate the back pressure against which our pump has to lift condensate.

## Understanding Back pressure

The condensate pump has to pump against a back pressure at the outlet. This is nothing but the sum of vertical head, frictional losses through the pipes and existing pressures, if any.

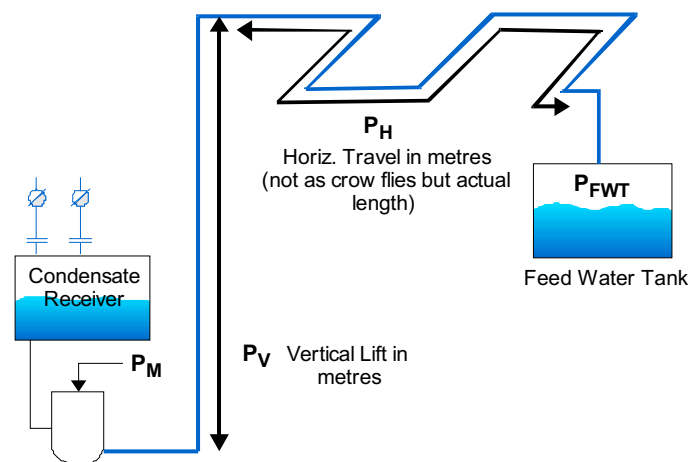
$$\text{Total Back pressure} = (P_v + P_H + P_{FWT})$$

Where,

$P_v$  = pressure because of vertical head of water  
= (0.1 X height in metres) barg

$P_H$  = frictional losses in horizontal travel  
= (loss of 0.003 barg/m of horizontal travel)  
For horizontal travel, we calculate the total length of pipe, and then add 10% to this for valves and fittings online, to get an equivalent length of pipe, ie, Eq. L = Horizontal length X 1.1

$P_{FWT}$  = pressure if any in the boiler feed water tank  
(0 if tank is atmospheric or typically 0.2-0.3 barg for a pressurized line /tank /deaerator)



$P_M$  = Motive pressure of steam or air

The motive force of steam/air ( $P_M$ ) must overcome this back pressure and lift the condensate to the boiler feed-tank.

$$P_M - (P_v + P_H + P_{FWT}) > 0.5 \text{ barg}$$

Let us take an example to illustrate how sizing needs to be done.

1. Motive steam available = Steam at 5 bar g ( $P_M$ )
2. Condensate load is = 1500 kg/hr
3. Vertical lift required = 15 m
4. Horizontal travel = 150 m
4. Feedtank is pressurized at 0.5 bar g

First calculate total back pressure.

$$P_v = (15 \times 0.1) = 1.5 \text{ barg}$$

$$P_H = 0.003 \times (150 \times 1.1) = 0.495 \text{ barg} = 0.5 \text{ barg}$$

$$P_{FWT} = 0.5 \text{ bar g (given)}$$

So, total back pressure is  $1.5 + 0.5 + 0.5 = 2.5 \text{ barg}$

Now, we select the correct pump for these parameters. We go down to a Motive steam of 5 barg, see the back pressure which is correct for us, in this case 2.5 barg, and look for a condensate load of 1500 kg/hr.

Motive Pressure (in barg)	Total Back Pressure (in barg)	Max. Capacity in kg/hr			
		CRPS25	CRPS40	CRPS50	CRPS80
1.5	0.5	910	1715	2525	4315
	1.0	850	1405	2240	3865
3.5	1.5	1015	1625	2500	4245
	2.5	860	1405	2105	3655
5	1.5	1095	1825	2700	4485
	2.5	1050	1695	2475	4275

Selection Table

From the selection table above, we can see that CRPS40 is the best pump for our needs.

If the motive pressure is not supplied by steam, but a pressurized air / gas, then the capacity of the pump increases by a factor as shown below:

Capacity multiplying factors for motive air/gas	
% Back press. vs. Motive press.	Capacity multiplying factor
20%	1.04
40%	1.08
60%	1.15
70%	1.20

Besides hydrotests and pneumatic tests, each Steamline CRPS is functionally tested in the factory for 72 hours prior to dispatch.



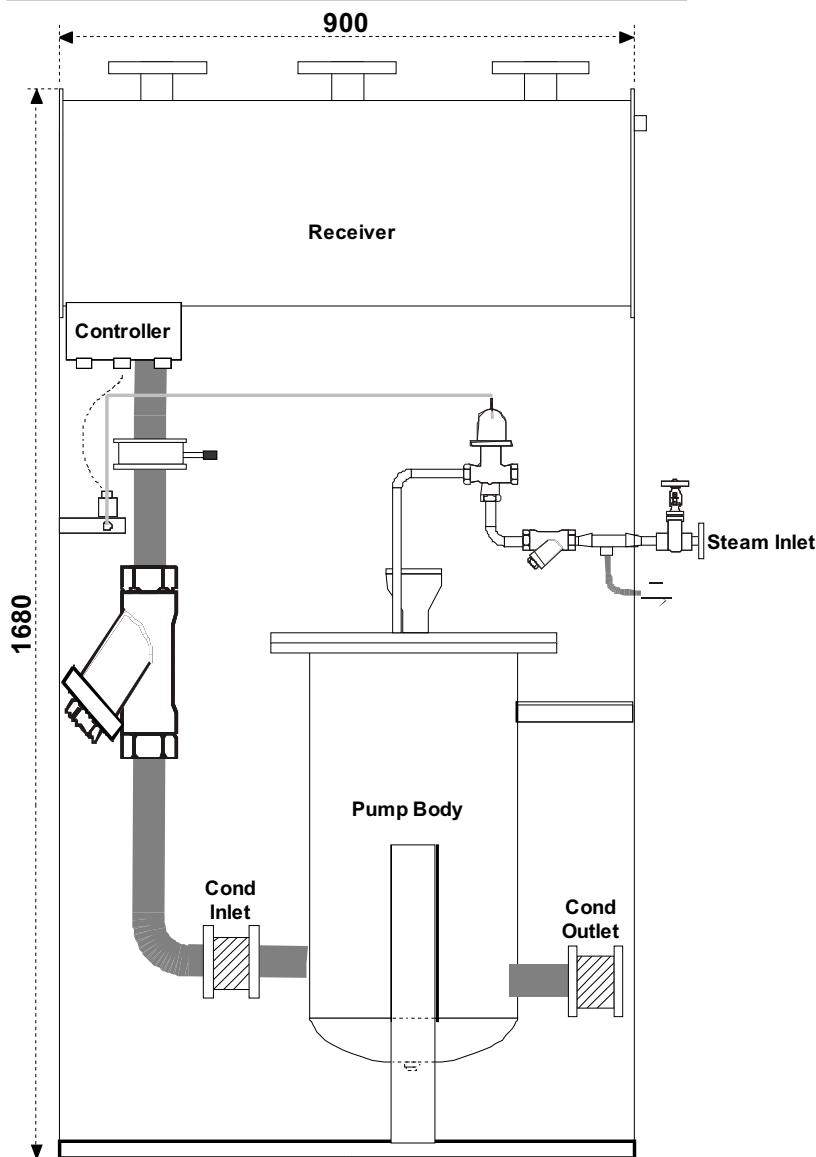
## Specifications

Pump Body Design 10 Bar g / 200°C  
 Steam Inlet 1/2" ASA # 150  
 Steam Exhaust 1/2" BSP  
 Condensate Inlets 2 nos X 2" #150 flanged  
 Condensate Outlet 1" / 1 1/2" / 2" ASA #150 flanged  
 Vent 2" ASA #150 flanged

## Connections & Protection class

Model	A	B	Part	IP rating
CRPS25	1"	1"	Solenoid valves	IP65
CRPS40	1 1/2"	1 1/2"	Controller	IP65
CRPS50	2"	2"	Probe enclosure	IP65
CRPS80	3"	2"	Flow Totaliser	IP40

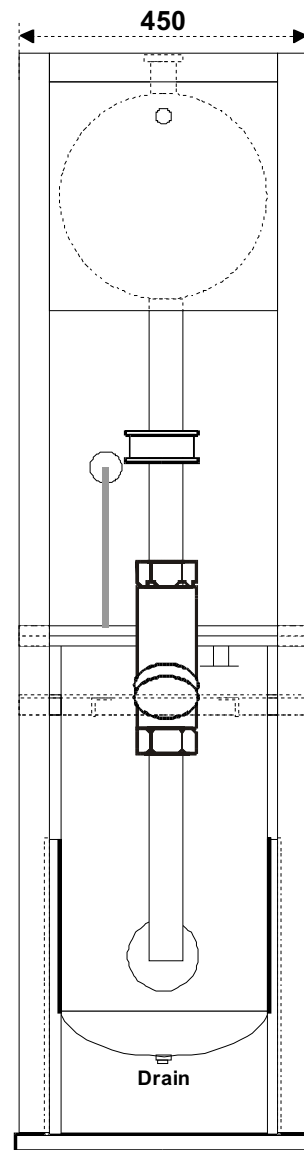
## CRPS 25/40/50/80



Manufactured and Marketed By :

## Material Specifications

S.No.	Part	Material
1	Pump Body	Fabricated steel IS1239
2	Receiver	Fabricated steel IS1239
3	Piping	MS IS1239/IS 3589
4	NRV's	Wafer Type SS 316
5	Float Assly	SS 304
6	Probe enclosure	Cast Aluminium
7	On-off valves	SS 304
8	Steam Inlet valve	SS 316
9	Condensate valve	Ni-plated brass
10	Controller	Polycarbonate



*In the interest of continuous product development, Steamline reserves the right to upgrade or modify any specifications without prior notice. For the latest revision, please refer to our website: [www.steamline.com/products.html](http://www.steamline.com/products.html) or contact your local Steamline Field Engineer.*



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