Steamline Flash Separator — Technical Data sheet

What **Benefit** can I **Expect** ?

Flash steam is just as good as live steam, and therefore the cost of flash steam is exactly the same as live steam. To estimate flash quantities quickly, we use the formula below to develop a set of graphs . (Note: Normally we flash at 0.5 or 1kg/cm^{2}g).

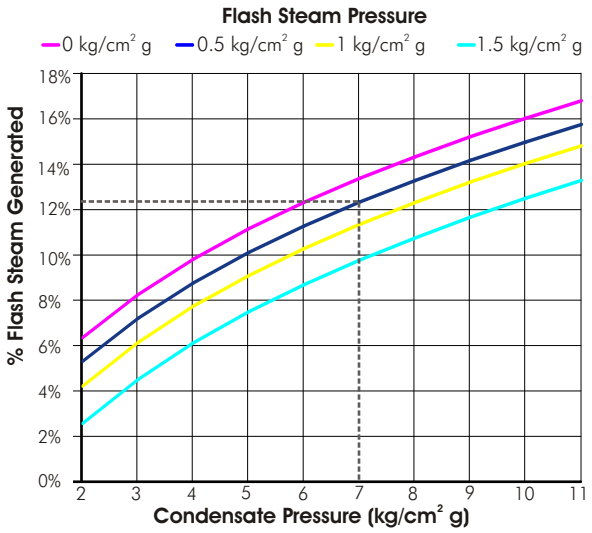
$$\% \text{ Flash Steam Generated} = \frac{(h_{f1} - h_{f2}) \times 100\%}{h_{fg2}}$$

Where,

h_{f1} = Enthalpy of water at higher press kcals/kg

h_{f2} = Enthalpy of water at the flashing press in kcals/kg

h_{fg2} = Latent heat of vapourisation at the flash steam pressure in kcals/kg



Calculating Flash Steam separated

For example, if a heat exchanger is supplied with 500kg/hr of steam @ 7 kg/cm^{2}g, this steam condenses to the same quantity of condensate after giving off heat to process. This condensate at 7 kg/cm^{2}g is discharged to a flash separator at 0.5 kg/cm^{2}g. Let us see how much flash steam can be separated.

In the graph above, travel up from the condensate pressure at 7 to the 0.5 flash line. At that point go to the Y-axis to see the % flash separated.

Quantity of flash steam =12.5% of 500 kg/hr = 62.5 kg/hr

$$\text{Fuel savings/hr} = \frac{\text{Qty of flash X heat content X Cost of fuel}}{\text{GCV of fuel X boiler efficiency X Sp. gravity}}$$

Assuming boiler is oil fired, furnace oil cost Rs. 18 per litre, and that the heat exchanger runs for 8000 hrs/year.

$$\text{Fuel savings} = \frac{62.5 \times 532 \times 18}{10200 \times 0.84 \times 0.88} = \text{Rs } 79.37/\text{hr}$$

= Rs. 79.37p/hr X 8000 hrs = Rs. 6,34,960 /yr

Water savings = Qty of flash X water cost/litre X hrs/yr

= 62.5 kg/hr X 0.04paise/litre X 8000 hrs/yr

= Rs. 20,000 /yr

The total savings are Rs. 6,54,960 /yr. A Flash Separator costs a fraction of this amount.

How can **Flash** Steam be **Used** ?

Utilising flash steam can improve boiler efficiency substantially, and decrease the steam consumption from the boiler.

- In continuous blowdown systems where blowdown rates are higher due to the poor feed water quality, heat from the blowdown water can be recovered in the form of flash steam.
- Nearly 50% of energy available in the hot pressurized water (either blowdown or condensate) can be recovered in the form of flash steam.
- Low pressure steam can be useful in LP steam processes. This is well illustrated in Fig 1.

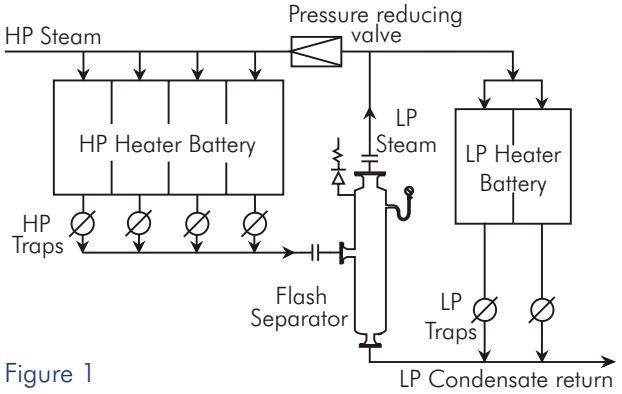
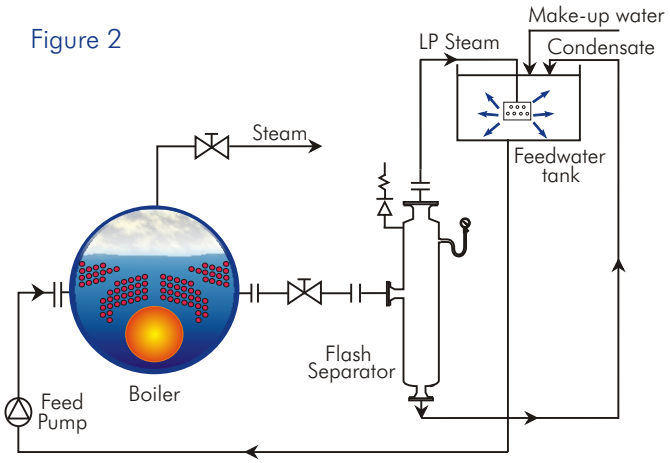


Figure 1

- Low pressure flash steam is often used in the deaerator to reduce dissolved oxygen content and save fuel by increasing feedwater temperature.
- Specific steam consumption is reduced by using flash.
- Even if no use at all can be found for low pressure flash steam , it can always be used to heat feedwater thus reducing fuel consumption. See Fig 2 below.
- It can even be condensed so at least the water can be saved.

Figure 2



A common thumb rule states that every 6°C rise in feedwater temperature results in a 1% fuel saving.

(Source: PCRA Handbooks for energy conservation)

STEAMLINE

Sizing and Selecting the correct separator

The FS is sized depending on the following factors :

- Condensate inlet flow to the flash vessel
- Pressure of the flash steam inside the flash vessel.
- Qty of flash steam (calculated)

Our heat exchanger example has an inlet condensate flow of 500 kg/hr. The quantity of flash steam as seen from the %Flash steam graph is =12.5% of 500 kg/hr = 62.5 kg/hr

From the selection table below, we can see that FS150 is the separator suited for our needs.

Condensate kg/hr	Flash Steam,kg/hr				
	50	100	200	500	1000
10000	FS350	FS350	FS350	FS350	FS350
5000	FS350	FS350	FS350	FS350	FS350
2500	FS250	FS250	FS250	FS350	
2000	FS250	FS250	FS250	FS350	
1500	FS200	FS250	FS250	FS350	
1000	FS200	FS200	FS250		
500	FS150	FS150			
250	FS150				

Selection Table

Specifications

Pressure Class	#150 (Higher on request)
Max pressure	10.5 kg/cm^2(g)
Max temperature	200°C
Flanges Std	ASA150

Standard Supplies

- ✓ Pressure gauge with syphon and cock
- ✓ Safety valve
- ✓ Strainer and steam trap
- ✓ Mounting kit
- ✓ Lifting eye (FS 250 and above)

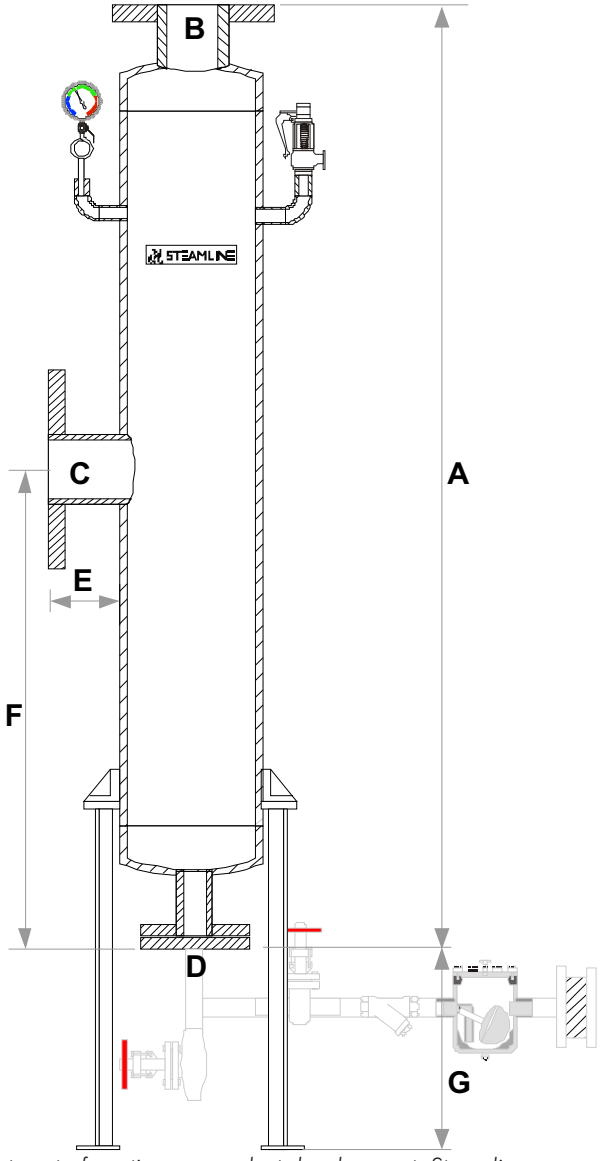
Ordering Information

☐ FS150 ☐ I =IBR ☐ S= Std. Flanges (ASA150)
☐ FS200 ☐ N=NIBR ☐ X= Non-std. Flanges
☐ FS250
☐ FS350

Manufactured and Marketed By :

Dimensions and Weights

	FS150	FS200	FS250	FS350
A in mm	1400	1600	1600	1800
B in mm	50	80	100	150
C in mm	50	80	100	150
D in mm	40	40	50	50
E in mm	100	100	100	100
Approx. wt. in kgs	50	75	110	190
F in mm	700	800	800	900
G in mm	700	800	800	900



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 or contact your local Steamline Field Engineer.

Steamline, Kondhwa Budruk, Pune, MH 411 048, India
Tel: + 91 20 2693 2213 Fax: +91 20 2693 2214
Email: info@steamline.com
www.steamline.com