



Heat Recovery and Vent less Condensate pump Skid at Mr. Wax



Business Case Study

The client at a industrial refinery, was dumping 100% condensate from the plant due to the fear of cross contamination. The Installed boiler capacity is 3000HP which runs 24 x7 all days of the year. They produce about 77000 pph of steam, all of which is dumped. Great opportunity for substantially big savings directly impacting bottom line of the company.

Application:

These locations consume at maximum 20,000 lb/hr of steam at a time and two of the heat exchangers work at one time. Pressure powered condensate pumps and flash tank for heat recovery

Solution:

For a load of 20000pph condensate pump Capacity required was 40 gpm. While returning this condensate, the proposed heat recovery in the form of flash steam was 1280 pph.

Flash Steam Capacity:	
Steam load Lb/hr	20000
Total Condensate Load gpm	40
Flash Recovery @ 5 psig	6.40%
Flash Steam Lb/hr	1280

Condensate Pumps & Flash Tank:

For a lift of 20 ft overhead and pumping the condensate back to 400 ft, total back pressure was 18 psig. With the possibility of using this flash steam at 5 psig, through heat coils on space heating, the flash tank size was 16"x 36".

Back Pressure	
De-aerator Vented / Max psig	7.5
Lift for 20 feet in psig	8.5
400 feet condensate line	2
Max Total	18

Flash Tank Size @ 5psig	
Header Diameter	16"
Flash Tank Height	36"
Vent Diameter	6"

We proposed a Nicholson make triplex 2" x 2" Condensate pump, for the proposed load. The TS sheet is attached separately in the email. The Total motive steam consumption will be max 60 lb/hr for 40 gpm. condensate. The Approximate footprint will be 100"x90". The proposed skid has an additional 20 gpm. pumping capacity built in for redundancy.

Condensate Pumps	
Motive steam	125 psig
Back Pressure	18 psig
Total Max steam Load Lb/hr	25000
Triplex Pump Size	2" x 2" Triplex
Suction pipe Head & length	12" x 2 feet

Payback: With existing 24x7 operation the payback was as low as 3 months.

Pounds per hour	1280
Hours per month	720
Pounds per month	921600
Savings	
6 \$ per 1000 lbs - Gas	5529.6
6\$ per 1000 lbs - Chemicals & water	5529.6
2\$ per 1000 lbs - Maintenance	1843.2
Total Savings per month:	12902.4
Rebate from Enbridge Gas (After 3 months)	12000

Advantages:

- 1) Unvented system, hence no corrosion of pumps and longer life of equipment and lines
- 2) No moving parts like the electric pump leading to minimal maintenance
- 3) Suitable for medium and large loads. Availability of motive steam eliminates use of motors
- 4) Flash recovery tank helps to recovery valuable energy in condensate and hence directly adds to bottom-line of the company
- 5) recovering condensate helps to reduce water consumption and chemical treatment in boiler rooms
- 6) Complete skidded system with no electrical components
- 7) Skid built with necessary safety equipment
- 8) Engineered for high