

COMPOSITE MAINTENANCE AND OPERATING EXPERIENCE

OF

FLASH COOLER PUMPS IN FLORIDA

W. W. Merkel

Our intent is to present some ideas that may help you to increase your Flash Cooler pump operating factors and decrease your maintenance cost. These ideas are not unique. They are based on a continuing study and data which we maintain as a part of our records. Hopefully we have developed a good composite view of operating experiences.

As a reference we have developed an average Flash Cooler pump. It could be described as follows:

16" Suction: 16" Discharge: 39" Impeller
12,000 G.P.M.: 36.5' T.D.H.: 1.61 S.G.: 175° F.
Normal Impeller Life: Six Months

The capacities of actual installations are in wide variation from this. Impeller wear life of more than fifteen months has been observed. Our records indicate the following areas of consideration for improving Flash Cooler pump installations:

CONVERSION

Convert existing 18 x 16 "G" Frame pumps to 20 x 20 "GH" Frame pumps. Using an existing rating of 13,500 G.P.M.: 30' T.D.H.: and 1.62 S.G., the following benefits would be realized:

- a. Impeller speed decreases by 25%, thereby increasing life by 73%.
- b. Brake horsepower decreases about 25%.
- c. The larger pump provides a greater ultimate capacity for future process increases.

MECHANICAL SEALS VERSUS PACKED STUFFING BOXES

There is a trend to convert Flash Cooler pumps from mechanical seals to packed stuffing boxes, based on practical operating considerations. Both sealing methods are being used with equal success. The choice must be made by consideration of process water balance, maintenance procedures, and reliability of sealing water supply.

In both sealing systems, some water is added to the process stream. The mechanical seal, when properly maintained, does require less water than conventional packing. In both cases the water which passes into the pump itself serves to keep gypsum solids away from the sealing mechanism or medium. In both cases the water source must be reliable.

If the process water balance can be maintained by offsetting the seal water required by a reduction in another area, then the use of packing is viable. The major advantage in using packing, is that the pump can be repacked without disassembly. As a result considerable savings in downtime can be realized.

DEGAS LINES

There is a wide variation in line size, from 4" nominal pipe size to 10" nominal pipe size. From our viewpoint, the installation of 8 and 10 inch lines have reduced parts usage considerably.

The choice of degas line size is apparently based upon experience with a particular rock and operating practice. Properly sized and maintained, they function to reduce cavitation in the pump, thereby increasing impeller wear life, capacity, and mechanical seal life.

PUMP SUCTION LOCATIONS

In four installations, the operators have chosen to bring the suction line directly thru the reactor tank sidewall rather than the conventional siphon leg over the top of the tank wall.

One operator has had a 14 x 12 pump, operating in this configuration for several years. The replacement parts experience is excellent. The flow rates are low when compared to the average, so that we do not feel that the experience is conclusive. The other three operators using this configuration have not established enough operating experience to report.

The advantages are attractive:

- a. Decreased suction line loses.
- b. Decreased scaling and chunking in the suction which often results in tramp gyp.

- c. Elimination of the potential gas bubble in the suction line which sometime causes the pumps to lose their prime.
- c. Elimination of the tendency of the pumps to cavitate due to entrained gasses.

ELASTOMERS

Traditionally the liners and impeller used in phos acid have been made from our 545 neoprene. There is evidence that butyl may provide the better impeller wear characteristics in Flash Cooler service than neoprene. Butyl is harder, Shore A (55 - 57) vs. neoprene, Shore A (53 - 57). Operating temperature range - 50 to 300°F for the butyl, to - 30 to 250° F for the neoprene. Tear resistance is rated "good" in both materials, and the price is about the same.

NOTES

