

Let the Debating Begin

Vacuum pump samplers, do they really cost more?

Less maintenance translates into less money being spent from a water or wastewater maintenance budget for both spare parts and labor.

- By Larry Kolbert

Can an automatic sampler last 15 to 20 years? For vacuum pump samplers, the answer is “yes” as it is not uncommon for users to report that vacuum sampler models last in excess of 20 years. It is possible simply because a vacuum samplers parts have a greater life expectancy. If a vacuum unit is installed correctly, technically there are no parts that wear out quickly. This also means that these parts do not need the routine repair or replacement needed to keep the vacuum sampler operating to specification.

Less maintenance translates into less money being spent from a water or wastewater maintenance budget for both spare parts and labor.

In some instances, there are vacuum sampler users that have had their systems for over 10 years before they needed to order their first spare part.

With peristaltic pump systems, pump tubing is a rather common replacement part. Manufacturers go as far as indicating in a manual that the factory-set value of a pump, for example, may be 500,000 pump counts, which will deliver 500 samples of 200 ml each using a 3/8-in. by 10 ft vinyl suction line at a 5 ft suction head.

Assuming that 24, 200 ml samples are collected per day, this extrapolates to a pump tube replacement approximately every 21 days or 18 times per year. At, say, \$15 per pump tube, the annual cost could be \$270 per sampler.

This does not include the time for personnel to replace the tube, nor the tubing replacements that may be necessary due to damage caused by hard solids being transported into the pump.

Peristaltic pump tubing wears but so do its rotor, stator and driveshaft along with gears if the pump has a gear drive.



The other side

A vacuum pump is based on moving air and does so much more efficiently than a peristaltic pump. Consequently, a vacuum pump can also more easily meet the EPA recommended minimum flow of 2 ft/sec at a greater draw height with out taxing the pump.

A peristaltic pump must run at a greater speed, reducing tube life, to attain this capability. In some circumstances, the peristaltic suction line may need to be reduced down from a size of 3/8-in. Vacuum pump systems are available with either 3/8-in. or 5/8-in. suction lines.

A 5/8-in. suction line on a sampler can be beneficial to those plants that have a high incidence of larger solids and suction line plugging where 3/8-in. suction lines have been used previously.

Vacuum pump samplers have an added benefit of not altering the sample. This is due to the sample solids not being pressed/squashed/adhered in the pump tubing by the pump rollers. The sample is taken to a sample chamber where the sample volume is accurately measured and then deposited in the sample bottle(s).

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Sample volume accuracy for a vacuum sampler is significantly better than a peristaltic sampler. The vacuum pump sample accuracy is not affected by pump tube wear, pump tube quality, head height and pump wear considerations.



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Low ambient temperature can also affect the peristaltic pump efficiency and sample accuracy as low temperature change pump tube flexibility. Contrary to some claims, vacuum samplers do not concentrate solids or affect the sample adversely due to a stronger purge and faster draw. In the final analysis, users of automatic samplers will find that a vacuum pump sampler is priced slightly higher than a peristaltic pump sampler. Unfortunately, this initial price difference can be the deciding factor in which technology is purchased.

However, if a user does proper “due diligence” when evaluating his or her needs over the long term along with desiring optimum performance for their needs, a vacuum pump automatic sampler could very well be a first choice.

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