Thinking Ahead

Pump optimization saves energy in your pharmaceutical or biotech plant

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Alfa Laval performed a large systems audit at a large hygienic processing plant which resulted in equipment adjustment, saving more than 36,000 EUR in annual energy usage and reducing carbon emissions by 100,000 kg. What's more, the investment paid for itself in less than a year!

Pump optimizing is highly relevant if you want to reduce energy consumption within your pharmaceutical or biotech processes. Pumping systems alone consume an estimated 25% of the energy at a typical plant. A plant's energy consumption can range from 90 kWh/h to 6500 kWh/h, depending on the final product produced; of this, a considerable amount of energy is used by the pumps.

By optimizing your pump selection, you can reduce energy consumption and realize savings of up to 50%[1].

So whilst not a new idea, pump optimization is highly relevant in today's competitive business climate. With the right pumps, you can reduce total cost of ownership, raise system performance and enhance your plant's environmental profile. The payback time for required modifications? Often, it takes less than a year. It is time for action!

Effect of energy consumption on total price

Capital cost is a minor proportion of the pump life cycle cost. Consider the effect of reducing the required motor power on the following:

Installation costs

The pump motor size will influence all the electrical components incl. cables, circuit breakers, frequency inverters, etc.

Running costs

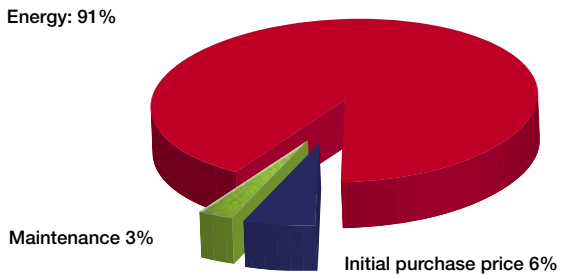
Energy consumption can be minimized by selecting the correct pump type and designing it for Best Efficiency Point (BEP). Energy costs money. You know that. But do you know that the energy used by your pumps is converted into heat? Some of the heat given off goes into the surrounding air, which has greater energy demands on the air conditioning to maintain suitable environment conditions. However, the majority actually ends up in the process which then must be removed by cooling in order to secure a stable process and finished product – all of which requires energy.

So first you pay to add it, and then you pay to remove it!

Effect on 24/7 water systems

Where you have a system which is running 24/7, for example in large Water-for-Injection (WFI) processes, the effect of a low efficiency pump contributes not only to the energy costs and environmental impact of carbon emissions but also the increased life cycle cost. Recirculation within the pump head can cause heat generation and increased vibration reducing the pump seal and motor bearing life. This will impact the uptime of the process, increase maintenance costs and will require additional cleaning cycles and sterilization to prevent cross contamination.

Typical Centrifugal Pump Life Cycle* Cost



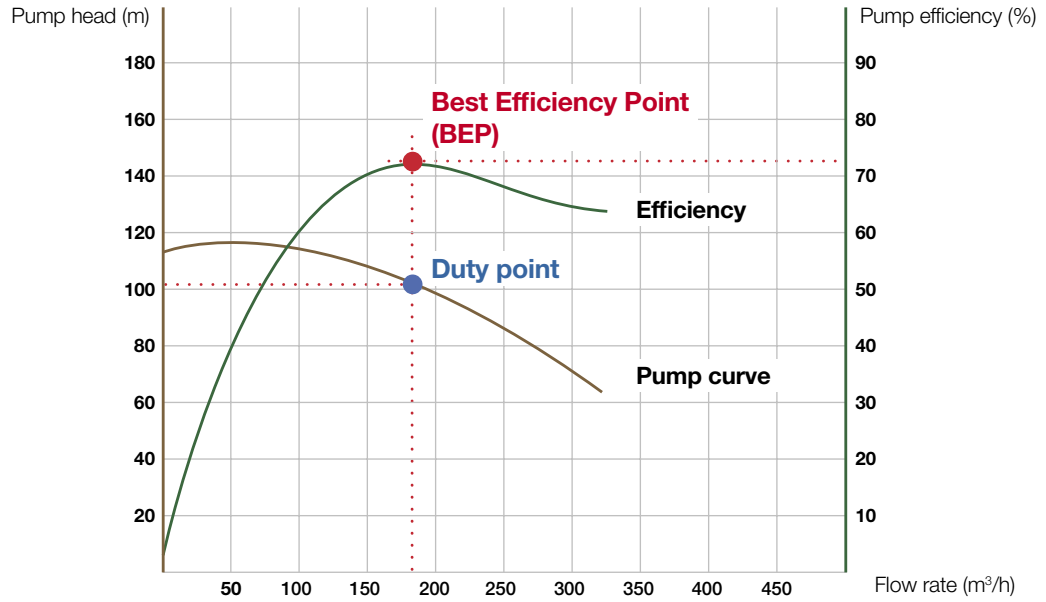
** Based upon Alfa Laval's Solid C-3 pump (11 kW) over 10 years.*

Alfa Laval LKH UltraPure Centrifugal Pump

Choose the Best Efficiency Point

The Best Efficiency Point (BEP) is the point at which a pump operates at the optimal head and flow rate to deliver the highest possible efficiency for a particular duty. The closer the BEP is to the duty point required, the higher the pump efficiency.

Best Efficiency Point (BEP)



Saving pump energy, how?

The principles of efficient pump operation apply to both new and existing systems. Because systems change over time and even minor changes impact efficiency, it is important to evaluate and modify systems continuously.

By auditing existing systems, it is possible to adjust pump operation and restore efficiency.

- Change your pump so it operates at the BEP
- Add a variable frequency drive, which will reduce energy costs
- Change the diameter of the pump impeller
- Change of pipe layout

Optimize to economize

So how do you save the energy used on pumping in your plant? Choose the right pump and optimize it! For that, you need knowledge and support and Alfa Laval can offer that. We are industry experts at guiding you to choose the right pump for your pharmaceutical and biotech applications.

To learn more: **www.alfalaval.com/pumps**

[1] *British Pump Manufacturing Association (BPMA), 2009 study, www.bpma.org.uk.*

About Alfa Laval

Alfa Laval is a leading global provider of specialized products and engineering solutions based on its key technologies of heat transfer, separation and fluid handling.

The company's equipment, systems and services are dedicated to assisting customers in optimizing the performance of their processes. The solutions help them to heat, cool, separate and transport products in industries that produce food and beverages, chemicals and petrochemicals, pharmaceuticals, starch, sugar and ethanol.

Alfa Laval's products are also used in power plants, aboard ships, oil and gas exploration, in the mechanical engineering industry, in the mining industry and for wastewater treatment, as well as for comfort climate and refrigeration applications.

Alfa Laval's worldwide organization works closely with customers in nearly 100 countries to help them stay ahead in the global arena. Alfa Laval is listed on Nasdaq OMX, and, in 2016, posted annual sales of about SEK 35.6 billion (approx. 3.77 billion Euros). The company has about 17,000 employees.

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How to contact Alfa Laval
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