Thinking Ahead

Pump optimization – here's how you save energy in your dairy

Article by Allan Bruun, Industry Manager, Dairy, Market Unit Food, Alfa Laval

Pump optimization – here's how you save energy in your dairy.

A system audit at a major European dairy resulted in equipment adjustment saving >36,000 EUR in annual energy usage and reduced 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 in your dairy. A dairy's energy consumption can range from 90 kWh/h to 6500 kWh/h depending on final product produced and of this a considerable amount is used on pumps[1].

By optimizing your pump selection, you can reduce energy consumption and realize savings of up to 50%[2].

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 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:

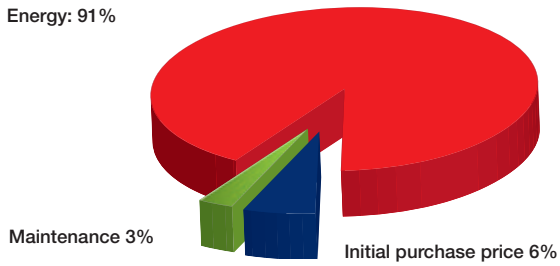
Installation costs:
The pump motor size will influence all the electrical components incl. cables, circuit breakers, frequency inverters etc.

Running costs:
Energy consumption can be minimized by selecting the correct pump type and esigning 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, but the majority actually ends up in your milk! Unless this happens at a heat treatment stage, that heat will have to be removed through cooling – and that requires energy.

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

Effect on your milk product quality:
A low efficiency pump adds shear rate and stress to your product. Those together with vibrations are in fact the major reasons for the low efficiency. Adding excessive energy to your milk prior to pasteurization will increase the risk of free fat. In yoghurt the shear rate and stress will decrease the viscosity that you have otherwise optimized to increase.

Typical Centrifugal Pump Life Cycle* Cost



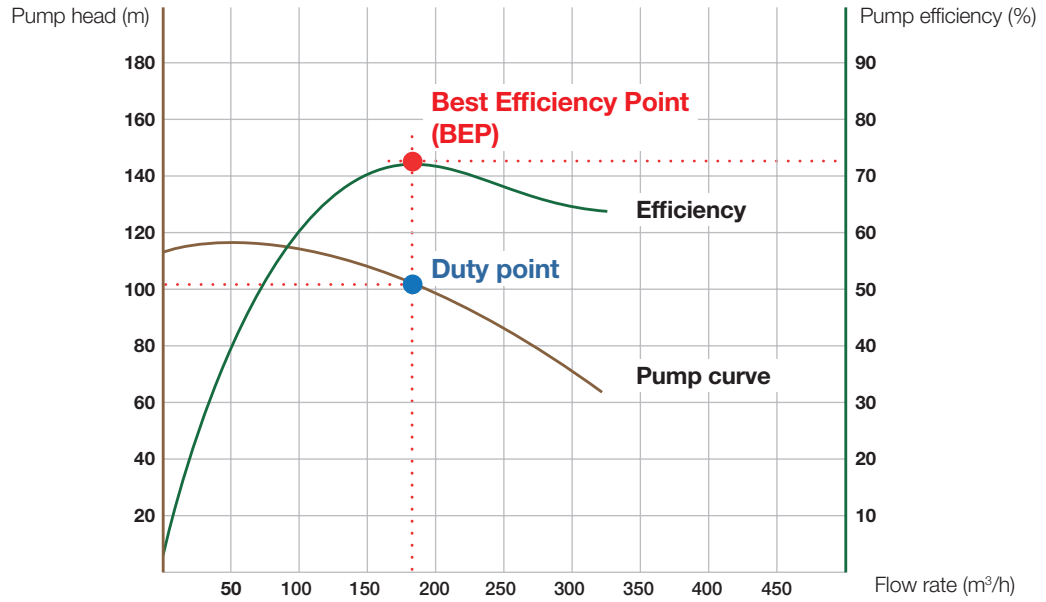
** Based upon Alfa Laval's Solid C-3 pump (11 kW) over 10 years.*

Alfa Laval LKH 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 dairy? – 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 dairy applications.

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

[1] *European Dairy Association (2002). "Consumption and emission data", EDA, personal communication*

[2] *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 engineered solutions that help customers heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Alfa Laval's worldwide organization of 16,300 employees works closely with customers in 100 countries. Listed on the NASDAQ OMX Nordic Exchange, Alfa Laval posted annual sales of approximately 3,45 BEUR in 2013.

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