ECO-DESIGN DIRECTIVE: A PUMP IS NOT A LIGHT BULB

Europump, the European Association of Pump Manufacturers which represents 17 National Associations with 450 member companies with a collective production value of more than €10 Billion, explains how its extended product approach can support the aims of the EU Eco-Design Directive.

The EU Eco-Design Directive aims to improve the environmental impact of energy-intensive products by optimising their design. Since pumps require a lot of energy, some inevitably fall within the scope of this directive. Better design could significantly reduce their energy consumption. However, considerably more can be achieved if the pump is not viewed in isolation, but as part of the overall system along with its electric motor and controller.

On this basis, Europump, the European pump association – of which the BPMA is a member – developed the extended product approach (EPA), which it hopes will be considered during the forthcoming EU legislative procedure.

After China and the USA, Europe has the third largest electricity consumption in the world – around 3,300 terawatt-hours (TWh) per year. More than 300TWh of this is accounted for by electric pumps. That is equal to the generated output of 30 large coal-fired power plants. No wonder the EU Commission, in its efforts to reduce consumption, also considered regulating pumps at an early stage in the process. The Commission selected those products and product groups that have the highest energy consumption and from which the greatest savings potential was available. Pumps clearly belonged to this group.

In contrast to many industries that see themselves restricted by regulation, and try to defend themselves against it, the European pump industry has welcomed sensible regulation from the outset. After all, what they had begun in 2004 continued at the political level: the search for efficiency gains. Using water pumps as an example, Europump found that their annual electricity consumption of 137TWh could be reduced by 35TWh – the equivalent of shutting down four coal-fired power plants.

This saving can be achieved by adjusting the pumping capacity precisely to the pumping requirement. This works with the help of a controller, for example a frequency converter or variable speed drive (VSD). This device makes it possible to reduce the speed of the motor driving the pump and as a result, the power of the pump. Normally, the motor of a pump always runs at a fixed speed; the pump always runs at full throttle even where the need for pumping power varies.

In a hotel, for example, the water requirement in the rooms is particularly high in the morning because the guests want to take a shower, but at noon it is comparatively low because there are hardly any guests in the hotel. However, the pump's motor will consume as much electricity all day as it needs in the morning. If less is needed, the motor will be throttled. The energy fizzles out.

KEEPING AN EYE ON THE RIGHT COSTS

"The savings come from the fact that we regulate instead of throttle. So, we achieve the 35TWh saving by reducing waste," explained KSB's Thomas Heng, who sits on various working groups at Europump.

These large energy savings, therefore, result from the ideal interaction of motor, frequency converter and pump. Consequently, it cannot be achieved by looking at the pump or the motor alone.

So why is this saving hardly used today? "Because consideration is often only given to the acquisition/installation costs and not the operating costs over the life span of the entire pump system. With the addition of a frequency converter, a pump's costs are invariably lower than without one," said Thomas. In most cases, a standalone pump would pay for itself after about two to four years. But in industry, this is regarded as being too long, since an investment needs to pay for itself after just two years or even faster. So far, pump users have largely refrained from designing their pump systems to run as efficiently as possible. This problem is compounded by the system planners' desire to provide generous performance reserves and with it a tendency to over-specify. Pumps are specified for the highest possible operating point, even if this is never achieved in practice. But, if the pump is too big for an application and is driven at full throttle, the waste of energy can be huge.

PRODUCT APPROACH FALLS SHORT

Since pump manufacturers have determined to curb this waste, regulation is just what they want. However, there is a catch; the Commission is following a narrow product approach in the Eco-Design Directive adopted in 2009. This is because the directive initially focused on new consumer products such as refrigerators, televisions and light bulbs. A light bulb is turned on or off. If it is on, it consumes electricity; if it is off, it does

not. However, a light bulb is self-sufficient, a pump is not.

Europump's study found that if pumps were looked at in isolation to trim their electrical consumption, savings of just 5TWh instead of 35TWh would only be possible with extreme design and production effort.

In principle, the EU Commission is prepared to consider the extended product approach as the basis for the efficiency analysis. But it cannot decide this on its own. "The problem is the member states. They say the extended product approach is too difficult for their market regulators to review," said Sulzer's Frank Ennenbach, Chairman of the Standards Commission at Europump. He added, "The critics' argument is that if three different product types – pump, motor and VSD – are combined and treated as one product or system, no one can check whether it has been configured correctly and that the savings are being achieved."

The counter-argument is the simple heating pump. For this small pump, which is installed many hundreds of thousands of times, there is already regulation – even though it is an aggregate in which, strictly speaking, the extended product approach has been applied. In this small unit, the pump, frequency converter and motor are assembled in a minimal space. The Commission has therefore considered the device as a single product, even though it consists of three separate products. The first heating pumps were regulated under the Eco-Design Directive as early as 2013.

SECOND EPA TEST FOR WATER PUMPS

Since 2012 there has also been basic regulation of water pumps, but only of the actual pump, that is the hydraulics, which transports a fluid from A to B. The water pumps are also regulated in principle. "We want to try and implement the extended product approach for water pumps in the upcoming revision," said Wilo's Markus Teepe, Chairman of the Eco-Design Working Group at Europump. So far, heating pumps have been subject to regulation as a unit and water pumps as a component. This is partly because there are more of them than any other pump type, and partly because large industrial pumps are often so special that they cannot readily be grouped into one category or classification. In the EU Commission, it is customary to review decisions every five years. The review of the water pump issue had been delayed but is now due for this year. The Commission usually has such technical issues reviewed by external consultants before reaching a decision. These experts meet with all parties involved. It is essential, therefore, that the pump manufacturers convince them of their arguments.

"A light bulb is self-sufficient, a pump is not."

www.europump.net