



The heat exchanger budget dilemma: why project and operational managers disagree

DAIRY, HEAT TRANSFER

There can be heated discussions over the purchase of a new heat exchanger. The project manager could be focused on keeping to a tight capital investment budget, while the operational manager wants to keep operational costs down in the long run, by paying more upfront. Can they ever agree?

A heat exchanger that gives both low capital investment cost and low operating cost would be ideal. Unfortunately, it seems you can't have the best of both worlds.

Don Bohner of Tetra Pak explains: "You have a dollar value for the operating energy cost attached to a specific heat exchanger solution. If you take that same piece of equipment and redesign it to reduce the operating energy cost, the capital investment cost will increase. There is no doubt about that."

The reason is that the efficiency of the heat transfer is related to the surface area. So greater energy efficiency usually involves purchasing a design with more plates or tubes.

Don Bohner is Product Manager for Heat Exchangers with Tetra Pak Inc. in Chicago with more than three decades' experience of working with heat exchangers. "When making a purchase decision on a piece of capital equipment, it is important to include the operational manager as well as the project manager in order to consider the operational and total cost of ownership of the equipment, as well as the initial investment cost," he advises.

Keep TCO top of mind

Total cost of ownership (TCO) is a method of calculating costs where you look at the overall costs for a period of one, two or three years, for example. TCO not only looks at energy cost but also the cost and lifetime of replacement parts. Vendors can often supply these figures for their equipment and Tetra Pak is able to provide such business calculations for their heat exchangers.

Of course, not all companies look just at the capital investment cost. They are willing to pay more for a heat exchanger that saves them money over time.

The person responsible for operations may not have the same view as the project manager, but if the TCO is calculated, the two of them may be able to reach some kind of compromise to pay more upfront in order to pay less later.

Example: Investment cost versus operational cost

In general, the higher the surface area, the lower the energy consumption in a heat exchanger. As an example, let's look at two mechanical designs for product-to-product tube heat exchangers depending on the target for operational energy costs.

When the target regeneration in the tubular heat exchanger was 80%, the recommendation from Tetra Pak was a heat exchanger with a set of 26 tubes, each 6 metres long. When the target regeneration was reduced to 70% and all other parameters were the same, the number of tubes required was only 19. Thus, investment cost went down substantially but energy consumption increased, as less of the heat from the product itself was recovered.

Which option should you choose? Of course, the decision depends partly on the price of energy and how often you are using the heat exchanger. An important consideration is the total cost of ownership and how long it will take the savings in energy costs to cover the extra cost of purchasing a heat exchanger with more tubes.

Tetra Pak would be happy to assist you to make a calculation for your particular application.

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