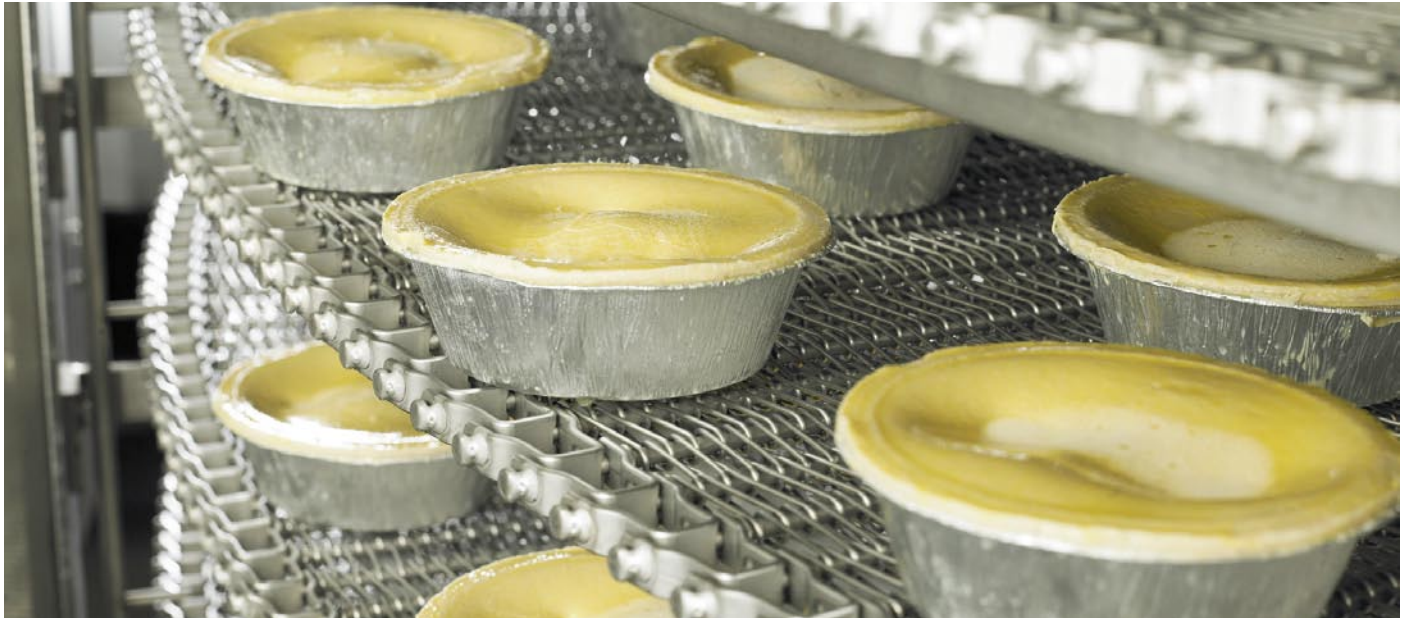


Case note

Refrigeration energy costs set to reduce by £6,000 with ABB drives



An ABB drive permits energy saving at partial load when used within a 315 kW screw compressor that provides refrigerant to a spiral freezer.

Poole's Pies of Wigan, in the UK, employs 100 staff and can produce 200,000 meat pies a day, as well as 80,000 other puff pastry products.

The installation of a new production line, complete with spiral freezer, designed for the manufacture of a variety of puff pastry products, prompted the company to look at improving its energy efficiency. For many companies in the food manufacturing sector, refrigeration can account for 70-80 percent of the electricity bill, so any savings made in this area are likely to be significant.

Installed by Seward Refrigeration, the refrigeration system operates on pumped ammonia refrigerant at an operating temperature of -40 °C.

Significant power reduction

Seward Refrigeration chose ABB drives to run two of the major components in the refrigeration system. The condenser is an evaporative type with the fan controlled by a 15 kW ABB standard drive. Variable speed operation of the fan gives significant reduction in power even for a small reduction in speed. For example, a 10 percent speed reduction gives 30 percent less energy consumption.

The other major component is the single 315 kW screw compressor used to provide refrigerant for the spiral freezer. The use of a 315 kW low harmonic, ABB industrial drive permits energy saving at partial load conditions. The screw compressor can operate at speeds between 1500 and 3600 rpm at 100 percent slide valve position. With this mode of operation, the machine operates at optimum efficiency for any given speed.

"Although the full load efficiency of screw compressors is good, part load performance with slide valve control is generally poor. With variable speed control of the compressor at Poole's Pies, we now have the best of both worlds: good efficiency at both partial load and full load," says Brian Seward of Seward Refrigeration.

"Since refrigeration systems typically run 24 hours, most fan and pump applications are potential candidates for low voltage AC drives. Any refrigeration system with a wide variation in operating hours or with a heat load that is less than the peak load can benefit from an AC drive."

Payback in two years

Poole's Pies anticipates an 11 percent cut in the cost of electricity consumption following the installation of the drives. The reduction will see costs cut by over £6,200, giving a payback for the project of 2.3 years.



The compressor uses a low harmonic, ABB industrial drive.

Another benefit comes from operating the screw compressor via a low harmonic, ABB industrial drive. This minimizes harmonic interference on the mains supply and avoids the use of complex solutions to ensure conformity with local harmonic regulations.

Other advantages of the ABB industrial drive include operation at unity power factor, allowing reactive power charges to be avoided. The standalone design of the drive gives it a small footprint, minimizing space requirements in the control room.

Challenge

- New refrigeration plant needed to run as energy efficiently as possible

Solution

- ABB drives installed to run condenser fan and screw compressor

Benefits

- Expected 11 percent cut in the cost of electricity consumption
- Costs cut by £6,200 a year with payback of 2.3 years
- Minimal harmonic interference
- Unity power factor operation avoids reactive power charges
- Small footprint minimizes space requirements

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