

Case PrimePac Limited
SynRM investment leads to 30% increase in
bottle production





When a 23 year old hydraulic blow molding machine was failing to deliver its proper output, Advantage Control provided the solution. ABB's synchronous reluctance motor (SynRM) and ACS880 variable speed drive package.



SynRM is running cooler and quieter than the equivalent IE3 induction motor, thus improving the working environment.

Container maker sees 60% fall in energy costs and 30% higher output

Benefits for the customer:	
Energy saving	Up to 60 percent fall in energy costs on blow molding machine
CO₂ saving	Up to 80 tonnes of carbon dioxide saved
Higher throughput	30 percent more usable plastic bottles
Improved quality and consistency of bottles	DTC's accurate speed regulation leads to consistent length and weight of plastic through extruder
Less waste	Speed regulation prevents erratic machine movements avoiding loss of plastic through varying tail lengths
Avoid high replacement cost	Saved \$44,000 cost of refurbishing pump and drive with same technology
Fast payback	\$11,000 investment recovered within 12 months
Avoid upgrade of electrical capacity	Saved \$356,000 cost upgrading from 600 kVA to 800 kVA electrical supply which enables additional all-electric blow molding machine to be installed
Quieter environment	SynRM runs quieter than standard AC motors

A worn out hydraulic motor on a 23 year old blow molding machine at Northern Ireland's PrimePac was using excessive energy and producing inaccurate speed holding, leading to poor quality plastic bottles.

"Previously I could create a bottle in 10 seconds, delivering 50 grams of material," explains Clifford Craig, Engineering Manager at PrimePac. "However, in recent years we had to run that bottle at 12 seconds because the extruder output wasn't quick enough. The extruder had started to create long tails, which are basically excess plastic that needs to be trimmed and recycled."

Energy appraisal reveals machine failings

An energy appraisal carried out by ABB authorized value provider, Advantage Control, revealed a potential energy saving of up to 30 percent by replacing the hydraulic motor with a synchronous reluctance motor (SynRM) and drive package. The energy appraisal showed that the power use was erratic and consumption was high due to the

hydraulic pack requiring extra torque on startup.

"We came in and logged, for one week, the energy use of the old machine against one of the existing all-electric models, both of which were making similar bottles of the same size and weight," says David Watt, Technical Sales Adviser at Advantage Control Limited. "Our energy appraisal was carried out on the main incoming supply which guaranteed that we weren't just seeing one particular motor. We looked at the entire machine and the efficiency across it. When we compared the efficiencies we could see that the old machine was consuming significantly more energy to carry out the same process."

However, once the SynRM package was installed the actual energy saving peaked at 60 percent. As a result, the \$11,000 purchase of the 55 kW, IE4 SynRM package is expected to payback in under 12 months.

Approximately 5 percent of the energy saving came from reducing the load



The ABB industrial drive, ACS880, uses the fourth generation motor control platform, direct torque control (DTC), a key benefit of which is highly accurate torque control without encoders.



Blow molding requires great precision to ensure product quality and to reduce wastage. Exactly right amount of plastic must be extruded when the mold closes.

on the 18.5 kW granulator that is used to chip waste plastic – long tails – cut from a bottle, before it is reheated and fed back into the blow molder. The granulator and accompanying heating routine is energy intensive and the process was now using more electricity, as Craig explains: “This all takes extra energy which in effect is for making the same bottle that you made five minutes earlier. You take energy to make it, energy to convey it, energy to grind it, energy to drive the screw.”

DTC improves speed regulation

The savings on the granulator is a result of improved speed holding accuracy such that bottles of a uniform length and weight are now being produced. The highly accurate speed holding is a result of the encoderless feedback offered by the direct torque control technology of the ABB industrial drive. Whereas previously 63 percent of extrusions successfully turned into bottles, today this has increased to 96 percent.

“The missing 4 percent is purely as the machine is ramping down,” says Watt. “So it has greatly improved the productivity as over 30 percent more bottles are fit for purpose.”

Unexpected benefit

Such are the energy savings that PrimePac was able to avoid a £250,000

(\$356,000) upgrade of its 600 kVA electrical supply, needed to power an additional all-electric blow molding machine for producing a new type of medicine bottle.

“We have 600 kVA of electricity coming into the company. We couldn’t install a new machine because we didn’t have the electric power; we were already peaking,” says Craig. “But with the 60 percent energy saving we achieved on the old blow molder we have been able to install another new all-electric blow molding machine. And even that machine is still not using all the 60 percent of energy we saved. This is beyond our wildest ambitions. We have managed to massively increase our production, just by installing one SynRM package from ABB.”

Improved working conditions

Other benefits of the installation include an improvement in the quality of the environment. “Now the operators can hear what their colleagues are saying while standing alongside the motor,” says Watt. “There are machines in the factory that are using standard AC motor technology and the SynRM package is running quieter than these comparable motors. Running cooler and quieter than the equivalent IE3 motor is an immediate demonstration of how much more efficient this motor is.”

PrimePac Limited

PrimePac Limited is located north west of Belfast in Northern Ireland. It specializes in continuous extrusion blow molding to manufacture a range of plastic bottles, containers and jars together with closures, pumps, sprays and various accessories. PrimePac invests extensively in new machinery, its staff and environmental initiatives. The company uses ABB authorized value provider, Advantage Control, to help reduce its energy bills and lower maintenance costs through timely advice on speed control of its machinery.



Clifford Graig, Engineering Manager

“Over the last four or five years we have seen great inward investment in new machinery.

So the company recognizes that going down the road of energy saving is also good for the environment as well.

It’s about saving energy, saving cost.”

Contact us

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