

Advanced forming control

Following the launch of the NIS™ machine last year, Emhart Glass outlines the benefits of its servo-electric technology over the pneumatic mechanisms used in traditional IS machines in the container forming process.

It has become increasingly clear that the survival of glass as a competitive container material will rely heavily on the development and application of new forming technologies. Advances in automation and the refinement of conventional pneumatic IS machine mechanisms have been ongoing for decades, but these changes have been evolutionary.

The introduction of the Emhart Glass NIS™ machine, however, presented the industry with an important advance in glass container forming technology, in the shape of total servo-electric operation. All NIS mechanisms operate and coordinate their actions using closed-loop AC servo-electric technology, removing most of the dependence on pneumatics.

Servo-electric drives are full programmable, allowing position, motion profile, and cushioning forces to be defined. The computer-based controls ensure that each cycle is exactly the same, so that each parameter of motion is known and can be stored, and that motion is predictable. As a result, the forming cycle can be precisely evaluated and optimized.

These advantages provide a powerful process development platform. In fact, with NIS machines already operating commercially at 366bottles/min and up to 92% pack, glass container manufacturers are actively developing new products and better processes that build on the foundations of this technology.

Total control

Servos provide complete positioning control of all mechanisms in terms of other mechanisms. This level of control allows process designers to develop new algorithms to refine the container forming cycle time, achieving maximum throughput and minimum wear on

the mechanisms. NIS mechanisms can be programmed to work on a just-in-time basis – to get where they are needed, exactly when needed. This level of control is not possible with a pneumatic machine.

This NIS also allows preventive and predictive maintenance schemes to be developed and initiated. Major NIS section mechanisms, such as the invert mechanism, can be more cost-effectively replaced during scheduled downtime than at a point of failure. A servo machine with computer controls enables precise benchmarking for mechanisms. A simple periodic check of how a mechanism is operating in relation to the benchmark helps determine when to replace a part cost-effectively and without disruption to the production process.

Servos offer additional workplace and financial benefits. An operating NIS machine produces only 25% of the noise level of a similarly sized IS machine, improving working conditions. Servomotors also consume significantly less electricity than the air compressors used for pneumatic motion, immediately reducing power cost.

Future Developments

Emhart Glass is working with customers to progress the glass making process from a manually controlled art to a computer controlled science. This is an important step forward for the glass industry for a number of reasons.

One reason beyond control that must be addressed is demographics. Around the world, key figures in the glass industry are ageing and retiring. As the glass forming environment is in essence a foundry environment, it has become increasingly difficult to attract young, talented and educated people into the industry, particularly at salaries that enable manufacturers to compete.

NIS technology enables container manufacturers to improve production efficiency, flexibility and control with a sophisticated system that can be operated successfully with minimal training required.



» Servo amplifier 3u module.

Emhart Glass continues its commitment to advancing the container forming industry by designing and producing more capable controls and software, and simpler, more user-friendly operator interfaces.

Additional features that integrate with NIS technology include advanced feeder and forehearth combinations and the Veritas™ container inspection systems. Each of these systems applies sophisticated technology to simplify the control of the glass making process and reduce running cost by operating more efficiently with fewer, less skilled operators on the job.

The Emhart Glass NIS offers a technologically robust platform for future development. Its full potential is highlighted as advances in the forming process, driven by NIS, provide opportunities for better understanding and process control, benefiting container manufacturers and consumers worldwide.

System advantages

NIS offers a range of short and long term benefits, all of which deliver cost savings, either in terms of lowering production costs or extending equipment life. Lower cost, higher quality containers and reduced defects will all help to cut production costs.

Reduced wear on mould equipment will lower maintenance requirements. Precise, repeatable mechanism motion helps to ensure a stable processing environment, and reduced noise levels help to ensure an improved operating environment. Decreasing the amount of damage to moulds, mechanisms and accessories are subjected to, will reduce both maintenance requirements and equipment replacement costs.

The self-supervising machine is easy to use, reducing training requirements. Error margins are lowered, resulting in increased production levels and superior quality glass. The potential for further automation gives users the flexibility to upgrade and continue the automation process at a speed that suits them.

NIS performance statistics

Production rate:	+ 2 to +14%
% pack:	+ 1%
Job change time:	- 20%
Workout time:	- 50%
Mould equipment cost:	- 20%
Energy cost reduction:	up to US \$40,000/year