Plastics Industry

Blow Molding

Application Note

Blow Molding is an injection molding technique used when a product's design makes it impossible to remove a solid mold core from inside the finished product. This process requires precise position, pressure, and temperature control.

The powerful programmable controllers now available have the necessary computing speed for these applications.

In addition to relay ladder logic, they can be programmed with high-level computer languages. Routines written in C or other languages can be imported.

Tight coupling between PLC sequencing and motion control lets the system run at maximum speeds.

The blow molding process is used to turn plastic stock into finished products. The process involves many steps:

1) Plasticize the raw material. This involves heating the plastic pellets hot enough to melt it by rotating a screw against hydraulic back pressure causing friction.

2) Form the parison, either by extrusion or injection of the plasticized material by opening and closing the tooling axis. This pre-shapes the parison to prevent thin areas as it is blown out into the mold cavity.

3) Close the mold around the parison and pressurize it with high-pressure air. This inflates the parison until it comes in contact with the cool mold walls, where it freezes.

4) Form, insert, and inflate other parisons as needed to complete the product.

5) Pressure release (cure). Release the pressure and wait for the part to cure while moving the part retrieval system.

6) Open the mold and retrieve the part.

The Motion Control modules from Delta Computer Systems, Inc. are uniquely suited to controlling these steps. These modules contain four axes of linear transducer interface, allowing coordinated control of position within a two millisecond loop. One module can control the plasticizer screw, the injector or extruder, the mold closing, and the part retrieval. The module also has multiple-property injector control (for complementary moves).

With Event Control firmware, up to 255 zones (steps) can be programmed into the module. The module can start it’s profile from any one of the 255 steps. Event response time is independent of PLC scan time and is one or two milliseconds.

A well-planned PLC program can control blow molding and motion control sequencing. Result: Higher throughput.

Important considerations:

Hydraulic: Sufficient hydraulic oil, adequate accumulator pressure, proper valving and accumulator location, plus fast linear valves with zero overlap, will ensure better control of machinery.

Controller: Fast PLC scan times and I/O update times of 40ms or less improve response time. Result: Increased throughput.

Benefits of using Delta's motion control modules include:

- High density modules: 2 to 8 axis' of motion control
- Fast 1 or 2ms control loop: smooth transition open loop to closed loop
- Error handling capabilities: the motion modules react to errors and quickly report to the PLC via bus communications
- Fully tested: Third Party Vendor module
- Event Control firmware - up to 255 synchronized zones

For more information, contact Delta Computer Systems, Inc. at 11719 NE 95th Street, Suite D, Vancouver, Washington 98682. Telephone 360/254-8688. FAX 360/254-5435. BBS 503/283-5646. Our 24-Hour Customer Service Pager number is 360/699-7784. Home page is **http://www.deltacompsys.com**

Delta Computer Systems, Inc. manufactures motion controllers, color sensors, and other industrial controls providing high performance automation solutions to a wide range of industries.