INDUSTRY: PLASTICS

Illinois Precision

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"The Eurotherm MACO Compact control system manages a wide range of variables which are needed for the successful implementation of medical molding processes such as repeatability, mold storage, setup storage and maintaining a complete history of the overall molding process."

Steve Schroeder
Business Development Manager
Invensys

Eurotherm MACO Compact Control System Enables Illinois Precision to Expand Business into Medical Industry

Goals

- Illinois Precision wanted to increase its market share by expanding into other industries, especially medical products
- Standardizing the control application of its medical press machines was a primary objective for the company
- Illinois Precision wanted to offer its OEM customers improved operations and streamlined manufacturing processes

Challenges

- The company needed to identify technology that could provide more precise process control
- The competitive marketplace demanded an expansion of company leadership in the medical molding market space
- Transitioning from an open-loop process to a closed-loop process required a technology that could provide a more precise and repeatable process for medical injection-molding applications

Solutions and Products

- Eurotherm MACO Compact Control System

Results

- The Eurotherm MACO Compact control system integrates more precise control of injection-molding processes for the medical industry
- Illinois Precision has made the Eurotherm MACO Compact standard for all brands of its presses
- The company's presses can better meet environmental requirements because the Eurotherm MACO Compact provides a more precise material processing application reducing scrap and improving overall operating efficiency

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Bicknell, Indiana – Injection-molding processes are key to the manufacturing of consumer and industrial plastic items used every day, from bottle caps and pipe fittings to eating utensils and surgical tubing. The process involves melting plastic pellets and transferring the molten material to molds to create products for a wide array of applications.

The technology incorporated into the injection-molding machinery has a significant impact on how quickly manufacturers can produce large volumes of product to meet customer needs as well as reduce overall production costs. All of which has a direct impact on the availability and price the customer pays for finished products.

Illinois Precision Corporation (IPC) has been in the business of developing injection-molding equipment since 1970. Machinery designed and developed by the company has been used in the production of products for a variety of industries such as electronics, automotive, appliances and sports.

Recently, the company identified the medical industry as an area for expansion and realized that a closed-loop system is required for this market segment, which demands extremely precise manufacturing standards.

To successfully compete in this market space, IPC selected the Eurotherm MACO Compact control system from Invensys Operations Management as standard technology to be incorporated in both its regular line of Echo presses and its new Echo MD line designed specifically for the medical industry.

Critical Medical Manufacturing Processes Expand IPC Market Reach

With a strong business commitment to improving and expanding its line of injection-molding equipment for the medical industry, Illinois Precision recognized the need for its presses to continuously perform at peak levels. IPC selected the Eurotherm MACO Compact to provide more precise machine control functions.

The Eurotherm MACO Compact supports the precise manufacturing requirements demanded by the medical field. Some of the medical products manufactured via the injection-molding process include oxygen masks and airway management systems, tracheal and feeding tubes, catheters, IV systems and blood collection sets, as well as infusion, flushing and drainage kits.

The process of injection molding for medical product manufacturing requires specialized tooling in the form of an injection mold and an injection-molding press. The process melts plastic in a heated cylinder which is then injected into the mold to form specific parts or components. This process may involve many variables which can affect the finished product. Therefore, the machinery must maintain precise calibrations in order to produce products that meet the stringent medical industry manufacturing requirements for quality and consistency.

“Many injection-molding methods use the simple open-loop process which is a low-cost, non-error controlling approach commonly used when reporting of production data is not critical,” said Steve Schroeder, Business Development Manager of Plastics at Invensys. “However, in the production of plastic medical products, precise measurement and manufacturing statistics must be adhered to exactly, so a closed-loop system must be used in production. The production process of these mass produced injection-mold products must not vary. Each batch produced must be exactly the same.”

In a closed-loop process, a sensor monitors the system output and relays that data to a controller which then adjusts the process for the optimal control of the system. This is done throughout the manufacturing process to maintain the exact system production criteria and ensure that the exact output specifications are met.

The MACO Compact offers a full range of features including closed-loop process control, clamp control, linear-positioning control of machine or auxiliary functions, pressure/flow control, auto-tuned temperature control, sequential machine control, and built-in timing and counting.

Its operator interface is designed to support maximum flexibility enabling IPC to run the system using its preferred interface design. The MACO Compact control system offers several keyboard options, from touchscreen to full numeric keypad functionality, with a display that supports in-depth process data trending, custom machine graphics, text displays, alarm messages and control standards charts. These features and benefits make the MACO Compact control system a reliable, cost-effective solution for any injection-molding operation.

"With all types of molding, but especially in medical injection-molding manufacturing, precise and repeatable processes are very important," said Schroeder. "The Eurotherm MACO Compact control system has enabled IPC to expand its offerings of machinery to the medical market since the Invensys technology provides required repeatability, and such needed features as mold and setup storage, and complete molding historical data."

Eurotherm MACO Compact Control System Offers More Precise Shot Control

Illinois Precision's new Echo MD Press with the Eurotherm MACO Compact control system features a new servo-electric rotary table that can pivot 90 degrees in one second. The servo-electric rotary table enables operators to have more control of the injection process.

Because process reliability is critical in medical injection molding, these new tables provide smoother movements and braking to ensure faster and more accurate production of injection-molded plastics items. With the Eurotherm MACO Compact, IPC is able to achieve a more precise shot control during the injection process, ensuring reproducible product specifications.

"Illinois Precision has gone from the basic 'push and squirt' process characteristic of an open-loop system to a closed-loop system for more accurate measurement and control of the injection process," said Schroeder. "For medical molding processes,

IPC machinery has to deliver an extremely precise and repeatable process which is inherent in closed-loop process control and statistical process control applications."

The Eurotherm MACO Compact was also selected for its enhanced processing features and ease of operation. In addition, because the Invensys technology is a comprehensive packaged solution it can be used to retrofit other IPC machine designs. The Invensys solution enables IPC's injection-molding machines to manage a wide range of manufacturing variables, provides storage mold design and setup specifications and maintains a complete historical database of molding operations.

With the implementation of the Eurotherm MACO Compact control system, Illinois Precision is positioned to successfully increase its market share in the medical injection-molding industry segment. By standardizing the control application of its medical press machines on Invensys technology, IPC has achieved a milestone in the design and functionality of its injection-molding machinery. IPC can now offer its OEM customers improved manufacturing operations and standardized processes, with greater precision, efficiency and repeatability.

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Rel. 04/11 PN EU-0102