PERSPECTIVES

Manufacturing Tech

The capabilities of manufacturers are growing to enable the fabrication of components that are extremely tiny, very complex, and incredibly intricate. These advances are leading to medical devices that could not have been developed just a few years ago. With this in mind, this months Perspectives asked about how these capabilities would impact future devices. While only a few are shared here, view all of the responses recieved online.

Q: *How will new(er) manufacturing technologies impact the design and/or capabilities of upcoming medical devices?*

Murtaza Fidaali

Director of Business Development, Medical and Industrial Markets, ITT Interconnect Solutions

Connector manufacturers are utilizing different manufacturing technologies in the development of connector contacts. While contacts are traditionally either stamped or machined, new manufacturing techniques are allowing contacts to be wirewound together, resulting in a high reliability contact system that exhibits very low insertion force even with a multiple (highs in 50s) pin and socket design. While typical connectors that employ pin and socket systems often result in extremely high insertion force and less mating cycles, such wirewound designs not only exhibit extremely low insertion force, but are capable of more than 10,000 lifecycles as well. They also don't need any cam action or other system to mate and de-mate.

Such compact plastic connectors with new contact designs are being employed in self-care equipment and hospital beds where sealing is not an issue, but robustness and cost-effectiveness are primary concerns. Multiple points of contact, positive wiping action, and a superior latching system further ensure reliability and are ideal for point-to-point electrical connections. The use of various medical-grade plastic materials increases robustness as well as cost-effectiveness, making these connectors unique and a better fit than traditional interconnect solutions for medical applications. MDT

Luke Tankersley

Medical Team Manager, Chiron America

As a machine tool builder, we continually see our capabilities pushed to the limits with new and innovative medical device designs and material selections. Cutting edge dynamics and the expanding world of six-sided machining allows design and process engineers to think "outside-the-box" of typical manufacturing limitations. This all-in-one capability allows greater complexity in part geometries while improving part quality.

The current demand for minimally invasive implants and instruments continues to push the envelope of manufacturing competency. While continually improving our abilities, those strides are soon filled with greater demands, thus continuing the cycle of better, faster, and stronger.

Our unique approach to work holding and data transfer allow production type manufacturing of custom components. The custom market surely holds the greatest promise in the medical device industry. Three dimensional scanning technologies and modeling advancements have facilitated an automated manufacturing approach for even the most difficult geometries. MDT

Michael Hansen, Ph.D.

Senior Technical Development Engineer, Mack Molding Co.

Gas-assist injection molding is a technology that introduces nitrogen gas to the traditional molding process. There are two forms: internal and external. With internal gas-assist, nitrogen gas is injected into a plastic-filled mold cavity to partially displace the molten plastic and produce a hollow, lightweight, relatively inexpensive part. The external process is designed to yield sink-free surfaces over ribs and bosses by forming a blanket of nitrogen between the underside of the part and the mold, gently pushing out any sink marks and producing a cosmetic surface.

While popular in other markets for several years, gas-assist technology is now channeling its way into medical device manufacturing because it replaces metal, consolidates parts, reduces weight and cost, encourages design freedom, minimizes secondary operations like painting, and generally decreases wall thickness while increasing part size. And that is always the ultimate goal–to make a bigger part with less plastic. MDT