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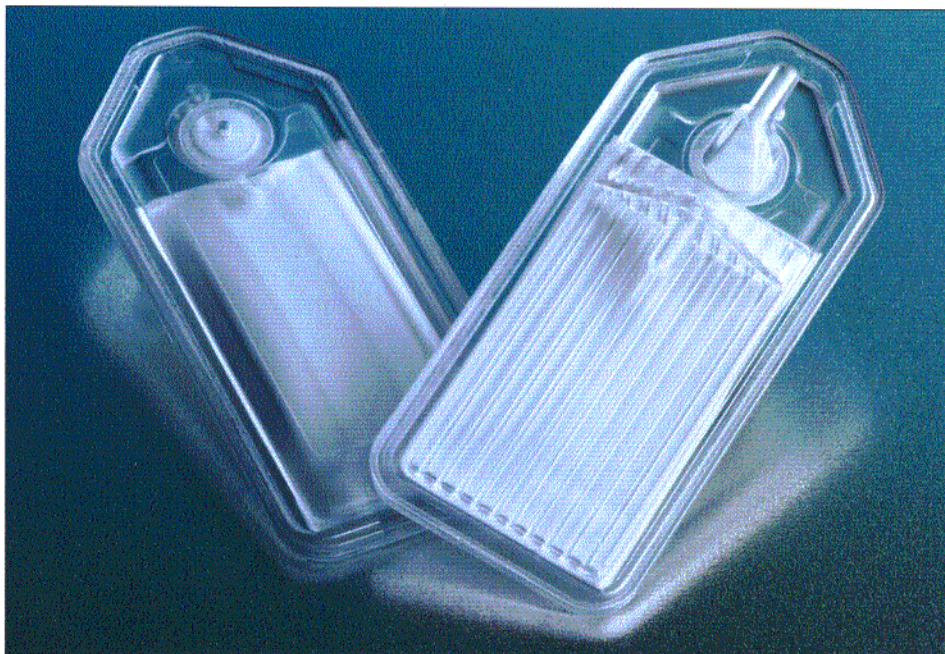
FOCUS ON IV Components

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Improved IV Filter Performance Is All in the Design

Value-added benefits hold high esteem as a product differentiator in the medical device marketplace. Convenience and value is what drove Filtertek (Hebron, IL) to design its Medipure™ IV filter. Specializing in filtration systems and fluid control devices, Filtertek incorporated design features that help both the IV set manufacturer with improved production and assembly as well as medical personnel using the device in hospitals. One avenue Filtertek explored to improve performance on the Medipure IV filter was new materials. Filtertek sourced medical grade acrylic polymers from CYRO Industries to add alcohol and lipid resistance to the Medipure filter housing for improved performance in the field. Benefiting both the set manufacturer and the end user, the Medipure's new design features convey value all the way through to the end-user.

IV filters are used in IV administration sets for applications such as parenteral feeding, medication delivery, or introducing saline into the body. Medication is typically mixed with saline and Dextrose in an IV bag. This type of medication administration allows drugs to be infused into a patient over time at a regulated rate. The medication/saline solutions in the IV bags can precipitate over time and form solids that are blocked from going downstream by IV



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filters, such as the Medipure. The Medipure filter removes any contaminant and entrapped air from the IV tube, preventing it from entering a patient's bloodstream.

Material Properties

The Medipure IV filter is typically used in hospital environments for medication administration during bedside care. The

filter housing incorporates a unique design molded from CYROLITE® CG-97 acrylic based multipolymer compound from CYRO Industries. CG-97 compound provided the Medipure filter housing with an effective level of alcohol and lipid resistance, as well as maintained the clarity expected in the filter. Alcohol is commonly found in hospital environments for swabbing and sterilization pur-

poses. Nursing staff often transfers alcohols to medical devices through contact. Alcohol can attack and degrade many plastic materials. Alcohol resistant compounds avoid damage that can commonly occur from such alcohol contact.

The lipid resistance of the plastic housing assists with improving flow and delivery of lipid solutions. Lipids present in internal feeding solutions can adhere to filter housing walls, preventing the entire volume of solution from traveling downstream at prescribed rates. The chemical resistant quality of the Medipure filter housing prevents attachment for better internal feeding performance.

A concern among OEMs is the amount of drug binding to IV components that can occur. Filtertek has conducted a series of tests and trials of the Medipure IV filter with a number of various IV administered drugs, and a range of molecular weights and pHs to document the degree of binding that could occur for OEMs to reference. The polymer and filter housing proved excellent in all tests and trials.

Filtertek intends to color code the filter housing according to membrane filtration size to prevent accidental mismatches in the field. Clear Medipure filters will identify a 0.2-micron, blue a 1.2-micron filter, and green for positively charged 0.2 micron filters.

Socket Advantage

Another advantage with the Medipure is the interchangeable port feature. Instead of inserting PVC tubing over the port to bond to the filter housing, Filtertek offers a version that

enables set manufacturers to stick the tubing inside a port and still retain a solid bond. The socket port feature offers the same bond integrity as PVC tubing placed over a male end connection. The socket port design also allows greater flexibility for set manufacturers. Rather than use several different types of tubing and connections to adjust for different flow rates, manufacturers can adjust the inner diameter (ID) of the PVC tubing itself while retaining the same connection.

“We developed the socket feature based on customer input. It provided an effective solution to cut turnaround on various IV set flow rate adjustments and speed manufacturing time to market,” comments John Leahey, Filtertek Medical Program Manager.

Self-Priming

Most IV filters are designed to be self-priming. In the past, filters needed to be inverted and tapped in order to expel air through the vent. The Medipure IV filter ensures that no manipulation is required by nursing staff to vent trapped air in the IV line, a benefit and comfort to hospital staff. When a solution bag is changed and a new bag is re-spiked, air can become trapped in the set. The filter is vented to allow air to escape and prevent potential air embolisms to patients downstream. While filters prevent air from going downstream in an IV administration set, air trapped in the filter housing will agitate nursing staff as they struggle to remove it.

“The industry has a standard for what it considers primed; we take it one step

further. Nurses are extremely concerned when air is present in the line. To make it easier and safer for nursing staff, we designed the Medipure housing with interior contours to facilitate the quick venting of all air in the line without effort,” adds Leahey.

Housing Integrity

In the past, peristaltic pumps could become occluded and build up pressure at an unregulated rate. These occlusions, if undetected, could eventually generate enough pressure to rupture housings. The Medipure filter housing has a uniform wall thickness that provides the integrity needed while also keeping the unit lightweight. CYROLITE CG-97 compound provided Filtertek with the impact resistance, rigid mold tolerances, and clarity required for use with pump fed IV administration. Filtertek chose the compound over other polymers because of its rigidity and strength. The acrylic compound also forms strong bonds on molded parts.

“It’s important that a filter housing not flex under pressure from peristaltic pumps, that is why we stringently test materials and tolerances to ensure a strong housing and solid mold design,” says Leahey.

Leahey adds, “The Medipure is an overall improvement—a true next generation product. The feedback from customers who have received it has been very good. We’ve introduced a new cost effective product that offers benefits to both the set manufacturer as well as the end-user.”

| | CYROLITE® acrylic-based multipolymer compounds | | | | |
|---------------------------------|--|-------------|-------|-------|-------|
| | G-20 | G-20 HIFLO® | GS-90 | CG-97 | Med 2 |
| Alcohol Resistant | | | | ▲ | ■ |
| Lipid Resistant | | | | ■ | ■ |
| Improved Flow | | ■ | ■ | ■ | ■ |
| Gamma & E-beam Resistant/Stable | ■ | ■ | ■ | ■ | ■ |

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