

DALI's SAN-DV Pro for drugs in vials: An integrated system for easy drug reconstitution, transfer, and injection, utilizing the SAN-L automatic-needle technology.



could not get it from the major suppliers.

Additionally, the increased need for combination therapies—and the fact that major pharma companies require exclusivity for use of the injection device they select for the drug/indication/therapeutic area—has translated into a few customization projects. Working with its autoinjectors partner, Elcam Drug Delivery Devices, DALI is developing the Flexi-Q line of autoinjectors to provide customizable options to customers.

Datwyler: Shift Towards Fluoropolymer Coating Technologies

For coated elastomeric closures, barrier properties are no longer the only requirement that meets the ever-evolving needs of biologic and biosimilar drug packaging. The reduction or elimination of silicone oil and its subvisible particles has been recognized as a means to mitigate risks and reduce time-to-market. Pharmaceutical manufacturers opt for fluoropolymer coating technologies, providing numerous benefits, especially for sensitive biologic drugs. Global industrial supplier Datwyler is meeting this growing need with its Omni Flex coating technology for elas-

tomeric closures.

“The packaging requirements of biologics and biosimilars are creating more specialized demands for material performance,” says Susan Dounce, PhD, Senior Manager Business Development & Innovation, Datwyler. “As a consequence, market trends indicate a growth in fluoropolymer coated elastomeric closures that help to mitigate risks related to drug compatibility and stability. Omni Flex fluoropolymer coated closures not only have barrier properties that enable superior chemical compatibility, but also have the added benefit of eliminating the closure as a source of silicone-oil-based subvisible particles (SbVPs).”

For a therapeutic protein, the exact chemical make-up and three-dimensional conformation can influence the efficacy of the drug product. Interactions with leachables, including silicon oil, often used to increase the glide force of plungers in prefilled syringes, can present a risk to the safety of therapeutic proteins, says Dr. Dounce.

Datwyler's proprietary Omni Flex coating technology is a flexible fluoropolymer spray coating applied to bromobutyl vial stoppers and syringe plungers. The technology is designed to be an inert barrier to organic molecules and metal ions

and imparts a low coefficient of friction, thereby eliminating the need for siliconization, explains Dr. Dounce. “The total coverage by the Omni Flex coating stands in contrast to the partial coverage of most barrier films, and therefore offers the benefit of providing a full lubricious barrier coating on the entire closure. As silicone oil from a traditional elastomeric closure can represent a significant source of subvisible particles, non-siliconized Omni Flex coated plungers' particle levels are among the lowest in the industry.”

All Omni Flex coated elastomeric closures are manufactured in highly automated facilities aligned with the company's highest, First Line, quality standard. Designed to meet the evolving standards of the parenteral industry, Datwyler's First Line standard incorporates a special facility design, process flow, gowning protocols, personnel, material flow, and automation, resulting in the lowest endotoxin, bioburden, particulate and defect levels available in the industry, she says. “This innovative approach to manufacturing exceeds the most stringent quality standards of the European and US regulatory authorities and is certified to ISO 15378.”

Datwyler is currently expanding its presence in the United States with the construction of a facility in Delaware that fully conforms to the First Line standard.

Enable Injections Inc.: Large-Volume Injectors Differentiate Combination Products

Biologic drug developers/delivery device partnerships are proliferating due to two merging trends. First, pharmaceutical companies are realizing that their drugs will not alone suffice in successfully navi-

Further ongoing development of elastomeric, plastic, and aluminum closures at Datwyler drives quality closures.



gating new outcomes-based models health systems are adopting. Incorporating newly available wearable large-volume injectors (WLVI) to deliver biologics in doses from 2 ml to 50 ml is widely expected to increase adherence to therapy, impact outcomes positively, and reduce health system costs. WLVI also address the second trend, patient-centricity. Nowhere is disruptive innovation to improve the patient experience more critically needed than for delivery of the viscous biologics that now comprise approximately 70% of products in pharmaceutical development. "It's no wonder innovative, patient-focused pharmaceutical companies are partnering with LVWI developers," says Jeannie Joughin, Vice President, Corporate Development, Enable Injections Inc. "Together they are better positioned to create patient-centric, differentiated combination products."

Prefilled syringes have largely eliminated the care, skill, and work required for patients to self-inject small-molecule drugs. Ms. Joughin says Enable Injections' advanced wearable large-volume injection devices do the same for large-molecule, viscous biologics. "Enable's WLVI makes it

very easy for patients to self-administer biologics without the need and expense of an IV infusion aided by a healthcare professional. And our ability to use any standard pharma industry container closure with a delivery system that is strongly preferred by users not only saves costs but also reduces development time by months."

Enable Injections' new WLVI devices are optimized to provide dosing flexibility, decrease dependence on healthcare systems, and improve compliance with therapeutic regimens. Accordingly, Ms. Joughin says Enable Injections is ready to manufacture its devices offering the customized flow and pressure control technology suited for delivery of the diversity of large-volume drugs that are in development, on the market, or in need of life cycle extension. "Our recently opened Cincinnati facility is manufacturing LVWI devices in quantities of up to 1 million, and for larger quantities, we have a manufacturing partnership with Flextronics."

Dr. Joughin wants to communicate two messages to the pharma industry. First, let go of the widely held belief that only relatively small volumes, under 2 ml, can be administered to the subcutaneous space. "With the availability of wearable large-volume wearable injectors, that is no longer the case," she says.

Second, be more responsive to consumer needs, quickly delivering innovative changes/customization. "This can be accomplished by partnering with companies that are addressing the major issues of patient-centricity, cost, and outcomes. Understanding patient needs and use of appropriate marketing tools will ensure pharma evolves ways to make the most of their products and services and help develop solutions, not just sell products."

Gerresheimer Medical Systems: Metal-Free Syringe Production

An important trend with regard to pre-filled syringes is the need for tungsten-free syringes, as some newly developed protein-based drug formulations are sensitive to traces of tungsten oxides. Today, glass syringes are still manufactured by means of a pin made from tungsten. Its residuals remain in the syringe bore after the forming step. Gerresheimer has solved this pending issue by substituting the tungsten pin with a special ceramic. This new material is non-cytotoxic and non-abrasive. To further this "metal-free" syringe production (currently available for luer syringes), a significant reduction of tungsten can otherwise be accomplished by a dedicated washing step, reducing the average amount of tungsten residuals below 10% of the original level.

Bernd Zeiss, Manager Technical Support Medical Systems, Business Development, Gerresheimer Medical Systems, says



To use the Enable Injector, patients need only insert a vial, cartridge or syringe, adhere the auto-filled injector to their body, and push one button; the injector automatically warms as it fills.