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Simplify Your Move from a Vial to a Prefilled Syringe

Lifecycle Planning for Containment and Delivery of Biologics Drug Products

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Executive Summary

Biologics are transforming the healthcare landscape, broadening treatment options, and improving patient outcomes. The growing number of approved biologics reflects ongoing innovation, promising further advancements in medicine. Read more about trends in the biologics market that could impact the lifecycle strategies for your drug product and steps you can take around drug packaging early in development to set yourself up for future success.

1. **Competition is Intensifying:** The biologics pipeline is growing, approvals are increasing, and more players are entering the market, further increasing the level of competition in an increasingly crowded therapeutic space. There are more than 2400 companies with active pipeline programs, with 70% of these programs targeting 3 key disease areas[1]. FDA special designations such as fast track and breakthrough therapy and expedited approvals are reducing new drugs' time to market, further driving the importance of speed to market. 70% of approvals in 2021 and 2022 were designated as expedited approvals[2]. Lastly, as biologic patents are due to expire and with new interchangeability guidance in place, biosimilars are poised to gain volume share from biologics, causing further downward pricing pressure on biologic drugs.

2. **Shift in Route of Administration:** The biologics market is experiencing a noticeable shift in the route of administration, with prefilled syringes outpacing vials in both growth and market share. In 2023 prefilled syringe and autoinjector volumes comprised almost 50% of the market, up from 35% in 2018 and are forecasted to grow 3x faster in volume compared to vials from 2023-2029[3]. Patient preference is driving a greater demand for easy-to-use delivery systems shifting the administration of drugs from hospital to home. Prefilled syringes offer benefits to patients such as precise dosing and faster administration. Additionally, drug companies are adopting prefilled syringe formats into their portfolio to increase their competitive position as they see benefits such as lower manufacturing and product costs.

3. **Regulations:** There are many changes and revisions to regulations that you need to understand and comply with when bringing your drug to market.

- Combination products are defined by the FDA as "a product composed of any combination of a drug and a device; a biological product and a device; a drug and a biological product; or a drug, device, and a biological product"[4]. Regulations for drugs packaged in vials versus combination products are different and it's critical that you understand the differences and what is needed for each type of filing. Different territories have their own regulations, guidance, and standards for combination products.

- In August 2023 an update to EU GMP Annex 1[5] introduced new changes which require more stringent sterile manufacturing process for injectable drugs. Implementing a Contamination Control Strategy was a significant requirement included in this revision.

- Lastly, EU Medical Device Regulation (MDR)[6], which includes products such as prefilled syringes in its scope, changes the European legal framework for medical devices.

The biologics pipeline is robust, and we expect more drug approvals, a rise in biosimilar uptake, and a continued shift towards patient self-administration. With competition fierce, drug companies are including differentiation strategies such as adding prefilled syringe systems and autoinjectors formats into their development to increase the value of their biologic drug product. Transitioning from a vial to a prefilled syringe is a growing trend, and it's important to understand the impact that your drug packaging selection can have on the success of the lifecycle of your drug product in all packaging formats that you plan to bring to market.

Selection of Container Closure Materials Can Reduce Time in Your Packaging Development Work

The most common way for companies to bring a drug to market is in a glass or polymer vial with an elastomeric stopper and seal. You could potentially gain a competitive advantage by planning in advance, even in the earliest stages of your drug development, for the appropriate selection of container closure materials that can be viable during the different phases of the drug product life cycle.

The West NovaPure® component portfolio in 4023/50 bromobutyl formulation supports the full development lifecycle for biologics drug products. The NovaPure® brand is West's premium line of components that include vial stoppers, prefilled syringe plungers, and cartridge plungers, all with the same elastomer material composition. Features of the NovaPure product line include:

- Developed, manufactured and risk managed under Quality by Design (QbD) principles.
- Tightest particulate specification available for West elastomers and are released to visible and subvisible particle specification limits, ensuring the quality of your drug product.
- Coated with FluroTec™ barrier film, reducing the risk of chemical or drug reactions.
- 100% Envision™ Verification Process camera-inspection of each component to reduce end of the line failure risks.
- Process Capability Index (CpK) for dimensional control.

NovaPure® products are designed to meet vial, cartridge and pre-filled syringe packaging needs and have the highest levels of manufacturing process controls around reduction of particulate in the West portfolio. Additionally, you can mitigate your supply risk by leveraging NovaPure products' global network that supports supply redundancy.

- NovaPure® stoppers protect lyophilized and liquid drugs from visible and subvisible particles and unwanted stopper interactions. They are available in 13mm and 20mm sizes in serum and lyophilization designs.
- NovaPure® plungers have been designed to reduce particulates, ensure dimensional control to facilitate consistency of drug delivery, while meeting the changing needs of higher volume injectable drug delivery systems. They are available in 1mL long and 1-3mL syringe plunger sizes.
- NovaPure® cartridge plungers are compatible with 3mL glass cartridge systems intended for drug delivery devices. They have an optimized design for low hold up volume and improved break loose and glide force profiles.

By choosing NovaPure® components for your initial vial packaging, you can simplify your transition from the vial to a prefilled syringe because the components are made from the same elastomer formulation 4023/50 and include the same FluroTec™ film. Benefits of selecting components with the same material composition include:

- Reduce testing by leveraging your existing drug product stability data: chemical compatibility, toxicity data, and extractables profiles will remain the same.
- Leverage the deep knowledge and insight that you gain from evaluating the long-term drug compatibility and interactions with the stopper when you introduce the plunger made of the same materials.
- Assurance of consistent quality and supply from the same packaging component supplier with standards for manufacturing production and final processing steps such as washing, sterilization, and vision inspection.
- Access to common technical documentation such as Material Characterization, Biocompatibility, Formulation Characteristics, Master Specification, and Compliance Bulletins

Collaborating With Your Packaging Supplier Early in Your Drug Development Can Help You Navigate Increasingly Complex Regulatory Requirements

Combination Product Regulations:
Prefilled syringes and autoinjectors are examples of drug delivery combination products. Combination products have different drug and device regulatory requirements compared to a drug packaged in a vial. Regulators are gaining a deeper level of subject matter expertise in this area, leading to increased expectations of drug companies who file for combination product approvals. Regulators' expectations are that drug companies must have a full understanding of both drug/biologic constituent as well as an equally full understanding of the device constituent. However, with evolving technologies, regulatory agencies do not have expertise in every possible drug and device combination. That means those agencies may not be able to provide you with the answers you're looking for, leaving you to figure out how to comply with the regulations. With West's support, you will have a strategic roadmap to proactively scope all regulatory requirements—including documentation and data packages, testing, and verification —to ensure compliance with standards and guidelines before development of your combination product starts. You'll plan out all necessary tests, filings, and other milestones of your combination product journey.

EU GMP Annex 1: In the new revision of Annex 1, the implementation of the Contamination Control Strategy (CCS) is the most important challenge to Quality Management in the manufacturing of injectables. Drug manufacturers are expected to provide comprehensive and formal documentation of the manufacturing process, from the receipt of raw materials to the distribution of the sterile drug products. The selection and evaluation of component quality is essential for compliance to EU GMP Annex 1, as the component specifications for particulates, bioburden, and endotoxins, will impact the overall CCS. NovaPure® components are West's premium line of components, offering the highest quality particulate specification for West elastomer products. They are supplied sterile, ready-to-use and can be directly introduced into your aseptic filling line.

West's analytical services team has an extensive portfolio of Container Closure Integrity (CCI) techniques and analyses to help customers make informed decisions in the selection of their containment systems to protect their drug products while meeting the requirements of EU GMP Annex 1. The revision of Annex 1 warrants some major changes to the pharmaceutical industry as it aims to further protect against product contamination and improve patient safety. While it is the responsibility of the finished drug/biologic product manufacturer to comply with the regulations described in the EU GMP Annex 1, West can help support our customers to navigate through these new regulations, to address any challenges they may face on the path to compliance.

EU Medical Device Regulations (MDR):
As drug products in prefilled syringes or other combination products continue to grow, more companies are likely to comply with the MDR. If you are a pharmaceutical company filing in Europe you are required to comply with MDR 2017/745 Article 117 for integral combination products, such as a prefilled syringe, which requires you to work with one of the 43 currently designated Notified Bodies (NB) in Europe (7) to complete a conformity assessment to MDR 2017/745 Annex 1 General Safety and Performance Requirements (GSPRs) (8) for the device constituent of the combination product. The results are then captured in the Notified Body Opinion (NBOp) which you are then required to include in the submission file to European Medicines Agency (EMA) or your national competent authority. West has developed a Technical Documentation Packages for our NovaPure® 1 mL long and NovaPure® 1-3 mL plunger portfolio used in prefilled syringe applications. This comprehensive document includes relevant West documents and information that can be used to support your submission filing to regulatory agencies or Notified Bodies. Additionally, West can support you as a resource to help you answer Notified Body questions and can also provide you with any additional testing needs.

Conclusion

Limiting the number of primary materials that come in contact with your drug product over its life cycle could lead to long term benefits such as an easier transition to combination products, reduced time associated with regulatory filings, and lower risks associated with your packaging development for self-administered systems. NovaPure® components are developed to provide the market with high quality, performance, and risk mitigation. The brand includes **stoppers**, **plungers**, and **cartridge plungers** in 4023/50 formulation with FluroTec film that can support your drug launch in a vial and future launches in a prefilled syringe or autoinjector. With ever-changing regulations and increasing scrutiny, it's challenging to keep up with the evolving regulatory standards.

Although there are regulations, guidance documents, and compendia in place, there is no "one-size-fits-all" approach to qualifying your packaging system. West is well-prepared to help you navigate the regulatory landscape for combination products, Annex 1, and MDR which will help you successfully transition from a vial to a syringe.

You can learn more about the NovaPure brand at the following web pages for stoppers, plungers, and cartridge plungers. To learn more about services and support that West can provide you for drug launch and lifecycle strategies, we invite you to **Contact Us** and we will connect you with an account manager in your region.

References

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