apiject™

Blow-Fill-Seal Temperature Management

QUICK FACTS

- **BFS is used to fill tens of billions of sterile liquid units a year**
- **Rotary BFS is recognized by the FDA as an advanced aseptic liquid packaging process**
- **BFS engineers have been successful in filling a range of biologics and vaccines**
- **ApiJect's team has decades of expereince managing lines that use both rotary and shuttle BFS machines**

INTRODUCTION TO BFS TEMPERATURE CONTROL

Temperature management is a frequent topic of interest when a pharmaceutical company is deciding whether to fill its drug product using Blow-Fill-Seal (BFS). This is especially true for companies or teams that are relatively new to BFS.

The good news is that the team at ApiJect can manage the temperature controls for most drug products to be within acceptable parameters. This has enabled a wide range of drug products, including vaccines and other biologics, to be commercially manufactured using the BFS process.

UNDERSTANDING TEMPERATURE IN BFS

The BFS process is divided into five main stages:

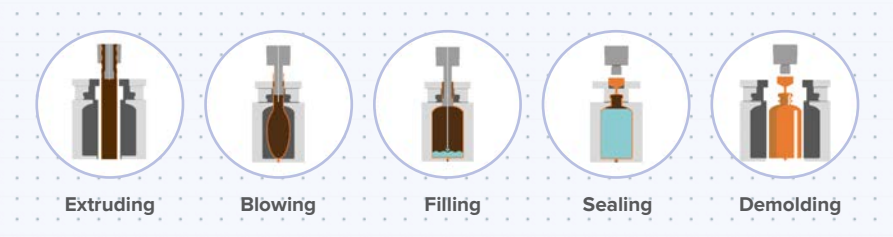
Extruding: Heated, liquefied resin is extruded to form a parison for the BFS mold.

Blowing: The mold closes, and sterile air is forced into the cavity, forming the container.

Filling: Using a time/pressure fill system, the exact amount of drug product is dispensed into the container.

Sealing: The top of the mold comes together, forming an aseptically sealed container.

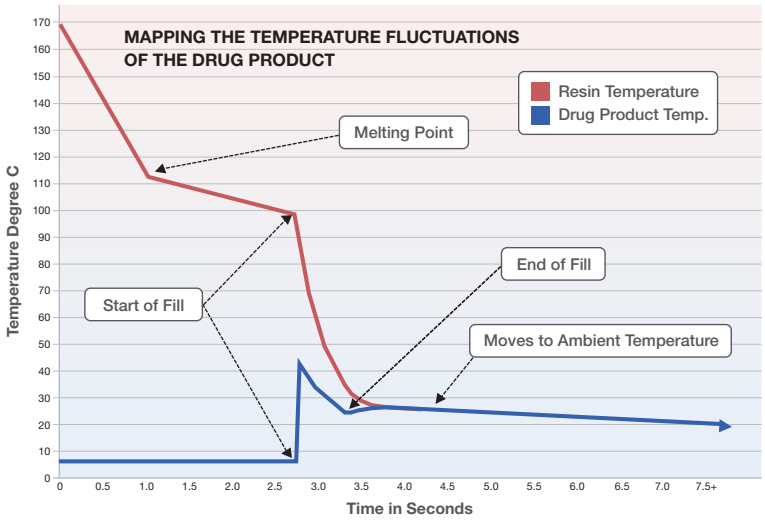
Demolding: The mold is opened and the filled container(s) are released.



IMPROVED TEMPERATURE CONTROL MECHANISMS AND PROCESSES

ApiJect's BFS and manufacturing experts use a variety of techniques to consistently manage the drug product's temperature throughout the fill-finish process.

Figure 1



This process includes:

Mold Design: The shape of the BFS container has a significant impact on managing the temperature of the drug product. ApiJect has designed the BFS container for its Prefilled Injector* to minimize the surface area that the drug product contacts, which reduces the heat transfer from the container walls to the drug product.

Wall Thickness: ApiJect's engineers have designed the BFS containers to use a minimal amount of plastic in order to expedite the cooling process, while still maintaining the integrity of the vial.

Pre-Cooling: ApiJect employs a variety of proprietary methods to chill the drug product and molds until the very moment the drug product is filled in the BFS container, there-by reducing high temperature exposure. The chart above is an abstract from a mathematical model[1] that estimates the temperature of the container and a 0.6mL fill drug product as it goes through the BFS cycle on a Rommelag® bp434 machine. As shown in Figure 1, the container is still hot when the drug product starts the filling phase. ApiJect's BFS experts have extensive experience using various methods of control to minimize high temperature exposure.

Post-Cooling: After filling, container separation, and leak detection are complete, ApiJect has developed processes to rapidly chill the finished units prior to packaging.

* The ApiJect Prefilled Injector has not been approved by the FDA or other regulatory authorities for distribution.

[1] The chart has been abstracted from an original published report by Jeff Price (then with Vital Pharma, Inc.) in 1998, and has been updated by the author for representative purposes only.

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MEET OUR EXPERTS

To learn more about how ApiJect uses Blow-Fill-Seal to package sterile pharmaceuticals and other liquids, contact one of our experts at solutions@apiject.com.

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FOR MORE INFORMATION:

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