Bonfiglioli™ Engineering

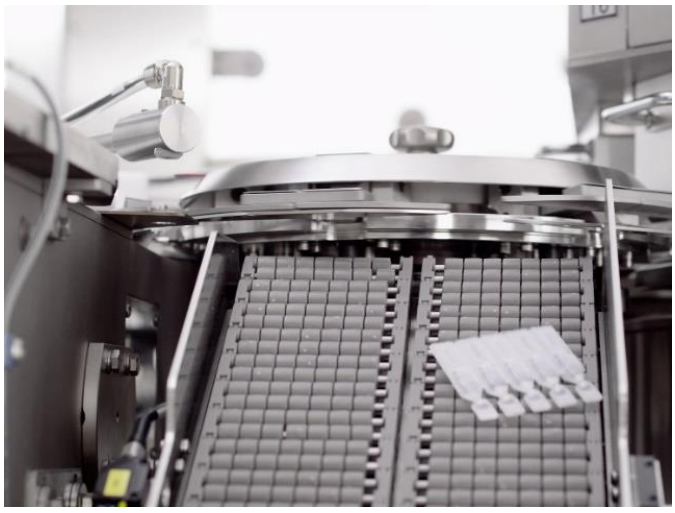
Blow-Fill-Seal

Packaging and Inspection

What is **Blow-Fill-Seal** Technology?

This technology is an advanced **aseptic manufacturing process** in which the containers are **formed**, **filled,** and **sealed** in a single continuous automated system, within a sterile area.

The use of Blow-Fill-Seal (BFS) technology is widespread within the **pharmaceutical and food industry** and is accepted by the U.S. Food and Drug Administration (FDA) in the packaging of pharmaceutical and healthcare products.



What makes Blow-Fill-Seal technology an ideal solution for pharmaceuticals?

Firstly, it reduces human intervention making it ideal for the aseptic preparations of **pharmaceuticals**. It is widely used to fill vials for parenteral preparations and infusions, eye drops, and inhalation products. Secondly, the plastic containers are made up of **polymers**. Polypropylene is more commonly used to form containers which are further sterilized by autoclaving. Thirdly, there is a **diminished risk** of particulate delamination, which could happen in the case a glass packaging. Fourthly, the polymer can be melted into any mold to create the desirable container making it a **flexible solution**. Lastly, it is ideal for **transportation** as it is **lighter** than glass and there is **lower** risk of **breakage** during transport.

Should I test BFS packaging for integrity?

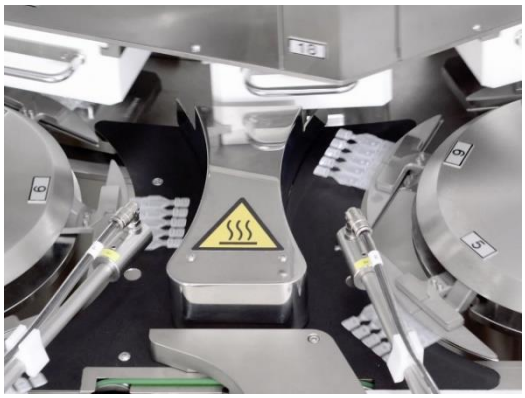
As with the many advantages offered by BFS packaging, there could be some downsides too, like with all containers it is certainly worth testing for container-closure defects.

The EU guidelines state that "containers closed by fusions, e.g., glass or plastic ampoules should be subject to 100% integrity testing". Thus, inspection becomes fundamental. The inspection of each unit will result in a reliable, final product examination that can identify defective units (e.g. "leakers").

There are a variety of leak-inspection technologies in the market, such as the vacuum-decay method (VDM) and high-voltage leak detector (HVLD). The vacuum-decay method (VDM) is often selected for biological manufacturing because of its zero-impact on product quality. During vacuum decay leak detection, the test article is placed inside a chamber, which is then evacuated to a known pressure. If the product container exhibits a leak, the chamber pressure will rise at a rate greater than a predetermined baseline value.

What should I consider when evaluating in-line leak detection for BFS packaging?

One of the **main challenges** with in-line leak detection operation is the **high false rejection rate**. Due to high temperature required for plastic extrusion, the ampoules, immediately after BFS process, are notably warmer than room temperature. When the products are immediately passed onto a vacuum-detection chamber, the **heat from the ampoule can cause a slight increase in pressure** which the instrument may interpret as a leaky sample, which will trigger a **false rejection signal**. Therefore, it is highly advisable to have the product equilibrated to room temperature prior to subjecting the product to vacuum leak detection.



What solutions does Bonfiglioli Engineering provide to combat BFS packaging leak detection challenges?

Bonfiglioli Engineering follows the procedure of **Vacuum Decay Method** which is Approved industry standard "**ASTM F2338-09":** "Standard Test Method for Non-Destructive Detection of Leaks in Packages" and approved by United States Pharmacopoeia – **USP General Chapter «1207»** "Packaging Integrity Evaluation" and EU Guidelines to GMP Medicinal Products for Human and Veterinary Use – Annex 1 "Manufacture of Sterile Medicinal Products" ; PDA Technical Report No. 27 "Pharmaceutical Package Integrity" as well as **EMA Annex 11.**

Handling BFS leak-detection for zero false rejections:

The measurement system adopted by **Bonfiglioli Engineering** comprises of application of a **pressure differential** into an airtight testing group enclosing the container. The test objective is to detect container leakages by measuring the reached vacuum level. It also measures the **vacuum change over test time**, so that a correct interpretation of the test results can be given, **reducing false rejections.**

The **PK-VS** is a non-invasive and non-destructive, 100% in-line Integrity Inspection solution for BFS containers. It offers an automatic drying system for zero testing chamber contamination and offers a speed limit of up to 220 strips/cards per minute for container formats from a minimum of 40 x 40 x 6 mm to a maximum size of 150 x 80 x 15mm.

https://www.bonfiglioliengineering.com/products/pk-vs/

The batch control is fast, reliable and repeatable. The quick format change offers versality for diverse container sizes. All this comes with remote access for machine data and exchange and real time display of testing cycle diagrams and raw data. It also offers and automatic head exclusion.

Bonfiglioli Engineering also offers laboratory equipment for small batch testing and for feasibility studies. The **LFS-11** is a Benchtop CFR21 Part 1 Compliant CCIT solution that offers Vacuum Decay Testing for various container types, with its quick format change over, including one for Blow-Fill-Seal. It is also equipped with a Barometric Compensation System to avoid any vacuum level reading variations and provides records storage for maintenance and statistical raw data with easy, quick and safe remote access.

Via Amerigo Vespucci, 20
44124 Ferrara, ITALY
+39 0532 715631

info@bonfiglioliengineering.com
www.bonfiglioliengineering.com