

White Paper



Ampule Sealing Methods: Tip Seal vs. Pull Seal



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There are two common methods for sealing glass ampules; the “Tip Seal Method” and the “Pull Seal Method.” This paper explains the differences, benefits, and constraints of using each method.

Tip Seal Method

The Tip Seal Method (a.k.a. Bead Seal Method) involves melting the glass at the top of the ampule downward. The ampule is constantly spinning during the sealing process to create a rounded, hemispherical seal.



The Ampulmatic-10 Ampule Filling/Sealing System utilizes the Tip Seal Method, as it creates a uniform, attractive and stronger seal than the Pull Seal Method.



Pull Seal Method

The Pull Seal Method melts the glass in the middle of the ampule neck. When the glass is melted, the top of the neck is pulled off with a small amount of thin glass melted to create the seal.



Ampules can also be called ampoule, ampul, or ampulla.

Tip Seal

Pull Seal

Appearance

Seal is hemispherical, with a uniform height and shape

Seal is pointed at the tip, irregular, sometimes a bead of glass is sharp or hanging.

Seal Strength/Integrity

Seal is made of thicker glass, very strong and uniform.

Seal is made from thinner, stretched glass that is not uniform.

Ampule Height

Each ampule is the same consistent height. The finished ampule will be taller with this method, unless shorter ampules are chosen.

The height of the ampule is dependent on where the glass was heated/pulled. The height of the ampules varies. The finished ampule will be shorter with this method.

Technical Ability

When using the Ampulmatic-10 System, the technician simply places empty ampules into the carousel and removes the sealed ampules. There is very little skill or training necessary. Setting the flame condition and dwell time in the flame initially is typically completed in 5 minutes or less.

When performed manually, Pull Sealing requires a trained technician with excellent hand-eye coordination and glasswork experience.

Equipment Variability

The Ampulmatic-10 System is highly customizable for each unique application. It is designed to accommodate sizes ranging from very small "onion skin" tubes to large 100 ml ampules. Many custom options are available including NMR tubes, test tubes, and chilled ampules. The Ampulmatic-10 System was designed to be easily adjusted for different ampules sizes and liquids.

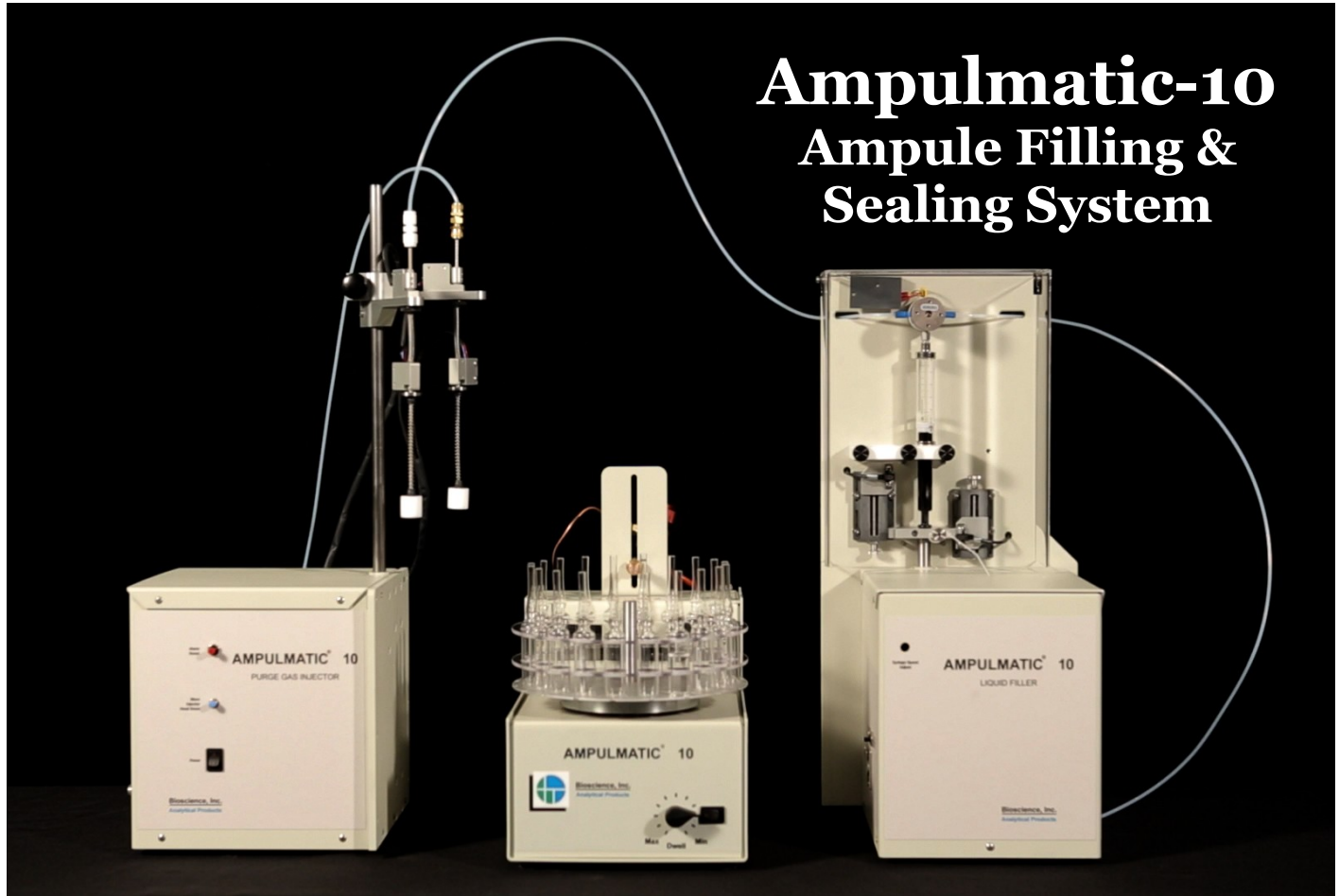
Most pull seal machines are built for very large-scale production and are not designed for a wide range of applications. Often they are limited by a smaller range of ampule sizes and dimensions and can be difficult to adjust between different sizes.

Safety

When using the Ampulmatic-10 System, the sealing process is automated. This reduces safety concerns of an operator handling a torch or putting their hands/clothes near the flame.

When performed manually, the operator must spin the ampules, pull the top off, and sometimes handle the torch. This procedure puts the operator at risk for accidents, burns, and ampule breakage.

Ampulmatic-10 Ampule Filling & Sealing System



The Ampulmatic-10 System is a bench scale ampule sealer with optional Liquid Filler and Purge Gas Injector accessories. The base unit sealer automates the sealing process. This System utilizes the tip seal method, and spins the ampules while sealing to create a consistent, hemispherical seal on every ampule. The ampule dwell time (time in the flame) can be easily changed by the turn of a dial. The sealer is designed for a wide range of ampule sizes, from very small “onion skin” 1 ml ampules to large 100 ml ampules.

The optional accessories automate the process of filling, purging and sealing the ampules. The Liquid Filler accessory fills volumes ranging from 0.1 ml to 22 ml with a relative standard deviation of 0.5%. The Purge Gas Injector fills the ampule with inert gas before sealing, reducing the residual oxygen concentration to 1%. This is especially useful when sealing volatile substances.

The Ampulmatic-10 System is small enough to be placed on a cart or inside a laminar flow hood. It is highly adaptable and customizable. Bioscience, Inc. personnel have worked with customers to solve a variety of difficult applications. We can perform testing in our laboratory to determine sealing procedures for your unique application.

Filling/Sealing Solutions

Corrosive Liquids
Viscous Liquids
Volatile Liquids
Flammable Liquids

Optional Accessories

Dual Flame Accessory
Dual Purge Accessory
Flame Shield Accessory
Safety Accessories (PPE)

Custom Ampule Types

NMR Tubes
Test Tubes
Onion Skin Ampules
Custom Glass Vials/Tubes

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