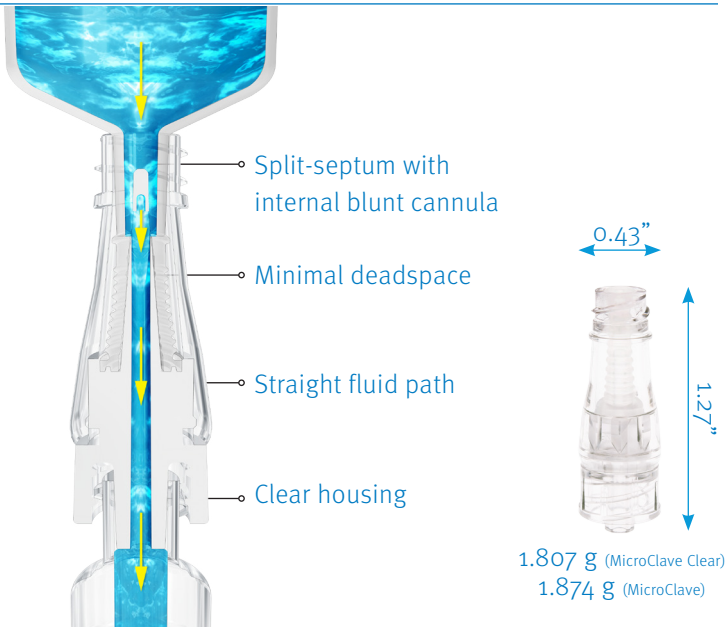
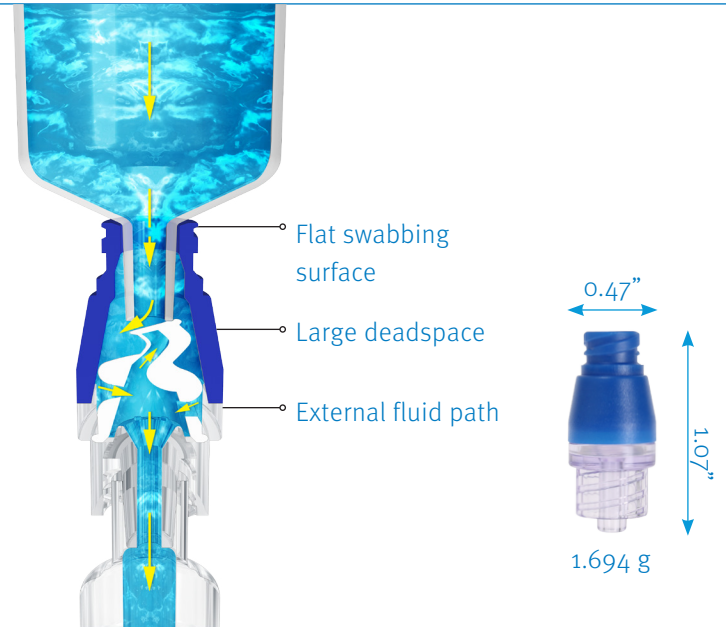


# MicroClave® and BioSite® Comparative Matrix

## MicroClave by ICU Medical Inc.



## BioSite by Lily Medical Inc.



PRODUCT PERFORMANCE	MICROCLAVE TECHNOLOGY	BIOSITE TECHNOLOGY
Base Technology	Internal cannula and silicone compression seal split-septum. Internal cannula windows are exposed by the insertion of a male luer, and cannula enters the male luer's internal space to achieve flow.	Surface septum. Crushable elastomer piston deforms upon luer connection to allow fluid flow around the septum. Fluid flows around septum and into septum.
Displacement	Neutral: 0 to -0.01 mL	Neutral: -0.01 mL
Residual Volume	0.04 mL	Claim: 0.07 mL. Performance: 0.33mL <sup>3</sup>
Fluid Path	Straight through polycarbonate cannula. Enhances flushing efficiency.	Between external housing, piston, and into piston interior. Results in comparatively large residual volume.
Moving Parts in Fluid Path	No	Yes
Clamping Sequence	None required	Yes. Clamp after disconnect.
Flow Rate	165 mL/min	Claim: 115 mL/min. Performance: Extreme variability noted, from 58 mL/min to 200 mL/min.
Clear Available	Yes	No
Antimicrobial Available	Yes	No
Flushing Performance	Highly efficient. Connector cleared of blood elements with minimal flush volumes (from 2 to 75 mL): <sup>1</sup> Not recommended to change connector after blood draw.	Unknown

Performance data on file at ICU Medical Inc. San Clemente, CA 92673. Reference ENG-433

Performance data on file at ICU Medical Inc. San Clemente, CA 92673.

1. Breznock E, Sylvia C. BioSurg, Inc., March 2011. The in vivo evaluation of the flushing efficiency of different designs of clear needlefree connectors.
2. Breznock E, Sylvia C. BioSurg, Inc., 2011. The in vivo evaluation of the flushing efficiency of the NanoClave™ low-profile neutral displacement connector compared to two other connectors commonly used on central and PICC lines.
3. ICU Medical Engineering Lab Text. CIC-0055. May 13, 2013. Data on file at ICU Medical.