## MicroClave® by ICU Medical Inc. vs. CLEARLINK® by Baxter Healthcare Corp.

### MICROCLAVE 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.

- **Displacement:** Neutral: 0 to -0.01 mL

- **Residual Volume:** 0.04 mL

- **Fluid Path:** Straight through polycarbonate cannula. Enhances flushing efficiency.

- **Moving Parts in Fluid Path:** No

- **Number of Assembly Parts:** 3, of which 1 moves on luer access.

- **Clamping Sequence:** None required

- **Flow Rate:** 165 mL/min

- **Clear Available:** Yes

- **Antimicrobial Available:** Yes

- **Patient Comfort:** 7% smaller profile, 14-17% less weight. Smooth profile.

- **Bacterial Transfer Performance:** The least amount of bacterial transfer of any connector tested.

- **Flushing Performance:** Highly efficient. Connector clear of blood elements with minimal flush volumes from 2 to 75 mL. Not recommended to change connector after blood draw.

### CLEARLINK TECHNOLOGY

- **Base Technology:** Mechanically actuated silicone septum. Insertion of a male luer pushes a silicone membrane apart and an internal poppet down. Fluid flows from the luer into the internal poppet, through the poppet windows, and around a fluid director into the lower connector housing and into the catheter hub.

- **Displacement:** Negative: 0.13 mL\(^2\)

- **Residual Volume:** 0.25 mL (over 6 times larger)

- **Fluid Path:** Fluid exits male luer into a polycarbonate poppet, out window into lower housing.

- **Moving Parts in Fluid Path:** Yes

- **Number of Assembly Parts:** 4, of which 2 move on luer access.

- **Clamping Sequence:** Yes, clamp before disconnect.

- **Flow Rate:** 118 mL /min

- **Clear Available:** Yes

- **Antimicrobial Available:** Yes

- **Patient Comfort:** Larger and heavier than MicroClave.

- **Bacterial Transfer Performance:** Exhibits a higher bacterial transfer rate than MicroClave.\(^4\)

- **Flushing Performance:** Baxter recommends flushing CLEARLINK connector with 10 mL or more after blood infusion/sampling. If CLEARLINK connector cannot be cleared of blood after blood infusion/sampling, replace immediately.\(^5\)

### Comparative Matrix

<table>
<thead>
<tr>
<th>Performance</th>
<th>MICROCLAVE TECHNOLOGY</th>
<th>CLEARLINK TECHNOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement</td>
<td>Neutral: 0 to -0.01 mL</td>
<td>Negative: 0.13 mL(^2)</td>
</tr>
<tr>
<td>Residual Volume</td>
<td>0.04 mL</td>
<td>0.25 mL (over 6 times larger)</td>
</tr>
<tr>
<td>Fluid Path</td>
<td>Straight through polycarbonate cannula. Enhances flushing efficiency.</td>
<td>Fluid exits male luer into a polycarbonate poppet, out window into lower housing.</td>
</tr>
<tr>
<td>Moving Parts in Fluid Path</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of Assembly Parts</td>
<td>3, of which 1 moves on luer access.</td>
<td>4, of which 2 move on luer access.</td>
</tr>
<tr>
<td>Fluid Residual External on Disconnect</td>
<td>Minimal</td>
<td>Minimal</td>
</tr>
<tr>
<td>Clamping Sequence</td>
<td>None required</td>
<td>Yes, clamp before disconnect.</td>
</tr>
<tr>
<td>Flow Rate</td>
<td>165 mL/min</td>
<td>118 mL /min</td>
</tr>
<tr>
<td>Clear Available</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Antimicrobial Available</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Patient Comfort</td>
<td>7% smaller profile, 14-17% less weight. Smooth profile.</td>
<td>Larger and heavier than MicroClave.</td>
</tr>
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<td>Bacterial Transfer Performance</td>
<td>The least amount of bacterial transfer of any connector tested.(^3)</td>
<td>Exhibits a higher bacterial transfer rate than MicroClave.(^4)</td>
</tr>
<tr>
<td>Flushing Performance</td>
<td>Highly efficient. Connector clear of blood elements with minimal flush volumes from 2 to 75 mL. Not recommended to change connector after blood draw.</td>
<td>Baxter recommends flushing CLEARLINK connector with 10 mL or more after blood infusion/sampling. If CLEARLINK connector cannot be cleared of blood after blood infusion/sampling, replace immediately.(^6)</td>
</tr>
</tbody>
</table>

\(^1\) ICU Medical Engineering Test Lab, Procedure P500-00037, Section 16.4, Data on file at ICU Medical.


\(^4\) Ryder M, deLaaney Pulcini E, Parker A, James G. Presented at the American Society for Parenteral and Enteral Nutrition Meeting, February 2013. Comparison of bacterial transfer and biofilm formation on intraluminal catheter surface among eight connectors in a clinically simulated in vitro model.


\(^6\) Baxter CLEARLINK® Directions For Use. Reference 07-19-53-247