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Clave™ Neutron™

Needlefree Neutral Displacement Connector

A needlefree neutral displacement connector featuring ICU Medical's clinically-differentiated Clave infection control technology with a bidirectional valve designed to prevent fluid displacement and help minimize occlusions

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The Clave Neutron needlefree neutral displacement connector is designed to reduce reflux to help

Minimize Occlusions

Maintaining catheter patency and minimizing occlusions can be important steps in your efforts to enhance patient safety and help reduce costs

Despite your efforts, central line occlusions—which are frequently caused by blood reflux—remain a significant issue that can result in delays in critical patient care, increased risk of infection, and increased healthcare costs. That’s why reducing the risk of catheter occlusions may help you decrease the need for expensive de clotting agents, such as t-PA, and reduce the clinical costs associated with managing catheter occlusions.

Neutron’s innovative anti-reflux technology helps stop occlusions before they start while providing a safe and effective microbial barrier

Our Neutron needlefree neutral displacement connector is designed to prevent fluid displacement resulting from the four known causes of displacement associated with needlefree connectors: connection or disconnection of a luer, syringe plunger compression, patient vascular pressure changes (i.e., coughing or sneezing), and IV solution container run-dry, which may cause multiple forms of reflux into a catheter.¹ The Clave Neutron also utilizes ICU Medical’s Clave needlefree connector technology, which is proven to minimize contamination and help you lower the risk of catheter-related bloodstream infections (CRBSI)^{2,3,4,5,6,7}.

Clave Neutron
Connector May Help You
Reduce Catheter Occlusions by

50%⁸

Warning: Clave connectors may be incompatible with some male-luer connectors including prefilled glass syringes. To avoid damage to the Clave or syringes or male luers which may result in delays of medication administration and possible serious adverse events, users should confirm mating luers or syringes have an internal diameter range of 0.062” to 0.110”. Check the internal diameter of the male-luer connector of the mating syringe prior to using it to access the Clave. Products outside of these dimensional tolerances should not be used.



Helping reduce catheter occlusions with the Clave Neutron needlefree neutral displacement connector may provide real-time clinical benefits



Avoid Delays in Critical Patient Care

Clave Neutron connector may help avoid delays in therapy of critical intravenous medications (e.g., antibiotics and oncolytics), nutritional support, and blood products.



Avoid Patient Discomfort and Pain

Clave Neutron connector may help avoid patient discomfort and pain caused by unnecessary needlesticks, catheter restarts, and manipulation of the IV site.



Avoid Unnecessary Costs

Clave Neutron connector may help minimize unnecessary costs that add up when treating an occlusion.



Help Reduce Risk of Infection

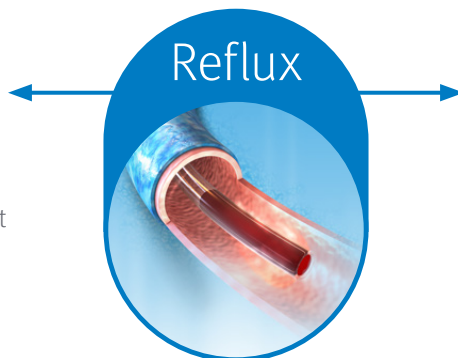
Clave Neutron connector may help reduce the risk of infection by preventing thrombosis and minimizing IV line manipulation.

Designed to prevent fluid displacement resulting from the four known causes of displacement

Reflux of blood into the catheter has been shown to contribute to biofilm formation and catheter occlusion.

Internal Causes

- › Patient Vascular Pressure Changes Caused by:
 - › Coughing
 - › Sneezing
 - › Movement
 - › Crying



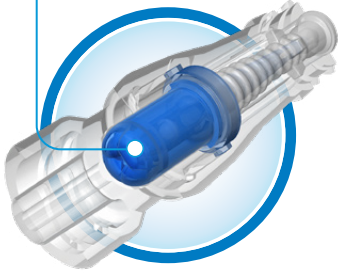
External Causes

- › Connection and Disconnection of a Luer
- › IV Bag Running Dry or an Infusion Pump Stopping
- › Syringe Plunger Rebound

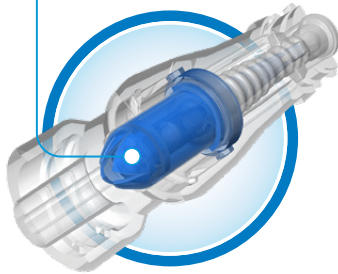
Advanced Anti-Reflux Technology

Because of an innovative design incorporating a proprietary, bi-directional silicone valve and bellows feature to help prevent reflux, Clave Neutron connectors help maintain catheter patency during the times traditional connectors have been shown to occlude most often.

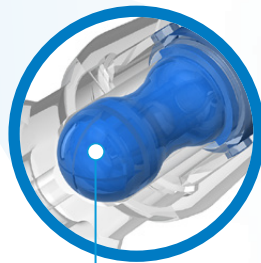
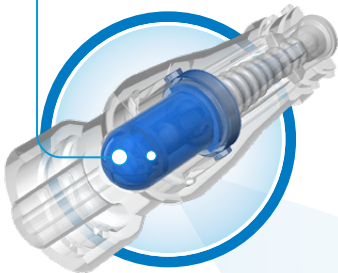
Valve During Aspiration



Valve During Infusion



Valve With No Fluid Flow



Valve During Reflux Challenge

Unlike other anti-reflux valves, Clave Neutron Connector's proprietary technology provides the unique ability to absorb and physically compensate for pressure variations that typically result in blood reflux into a catheter.



Clinically-differentiated Infection Control Technology Proven to Minimize Bacterial Contamination^{2,3,4,6,7}

Clave Neutron connectors can help your efforts to reduce bloodstream infections by minimizing entry points for bacteria and maximizing the effectiveness of every flush.



Silicone Seal and Internal Cannula Minimize Point of Entry for Bacteria

Specifically designed to minimize contact between the connector's external surface and the internal fluid path upon luer activation, Clave Neutron needlefree IV connectors minimize entry points for bacteria. Several studies have attributed this feature to a reduction in bacterial contaminants passed through the connector.^{2,3,4,9}

Split Septum

Clave Neutron connector's normally closed, swabbable split septum design is a preferred feature for needlefree connectors.¹⁰

Straight Fluid Path

Clave Neutron connector's straight fluid path allows for efficient clearing of medications, blood, and blood residual with low flush volumes.^{11,12}

Minimal Residual Volume

Clave Neutron connector's minimal residual volume allows for lower flush volumes.

Clear Housing

A clear housing lets you see whether you have completely flushed the connector after blood draws or administration.

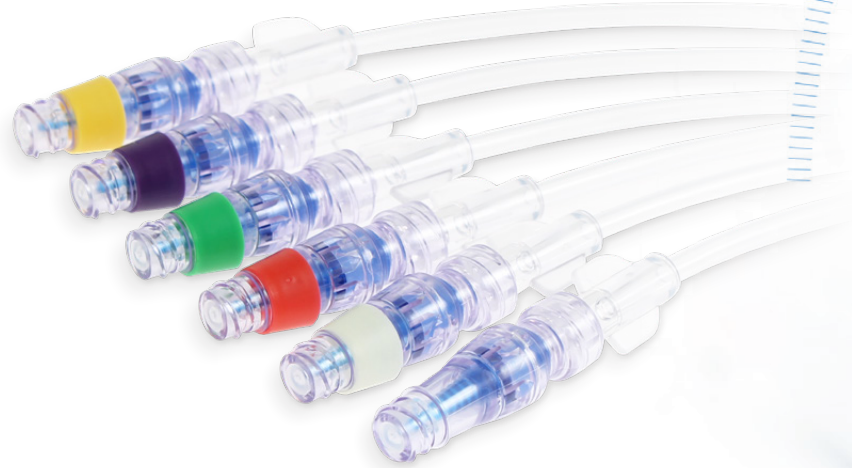
Add a Splash of Color

For Quick and Easy Line Identification

Customize Clave Neutron connector's with a variety of color-coded rings to help you improve IV line management and avoid medication mix-ups

Color-coded needlefree IV connector rings designed to help reinforce your facilities line-identification initiatives:

- > Enhance patient safety and reduce the possibility of medication errors
- > Quickly access the proper infusion port in emergency situations
- > Improve connector change interval compliance with better needlefree connector identification



To learn more about ICU Medical's Clave Neutron neutral displacement connector, please call 877-946-7747 or visit www.icumed.com

Technical Specifications	
Residual Volume	0.1 mL
Flow Rate at Gravity	100 mL/minute
Blood Compatibility	Yes
MRI Compatibility	No Metal Components
High Pressure Compatibility	10 mL / second and 350 psi

Drug Compatibility	
Alcohol	Yes
Lipids	Yes
Chemotherapy	Yes



Neutron's saline flush option is designed to help you reduce risks, cost, and time associated with Heparin use.

1. ICU Medical Clave Neutron 510(k) K100434, June 24, 2010
2. Ryder, M., DeLancey-Pulcini, E., Parker, A., & James, G. (2023). Bacterial transfer and biofilm formation in needleless connectors in a clinically simulated in vitro catheter model. *Infection Control & Hospital Epidemiology*, 1-9. doi:10.1017/ice.2023.60.
3. JD Brown, HA Moss, TSJ Elliott. The potential for catheter microbial contamination from a needleless connector. *J Hosp Infect*. 1997; 36:181-189.
4. Yebenes J, Delgado M, Sauca G, Serra-Prat M, Solsona M, Almirall J, et al. Efficacy of three different valve systems of needlefree closed connectors in avoiding access of microorganisms to endovascular catheters after incorrect handling. *Crit Care Med* 2008;36: 2558–2561.
5. Moore C, RN, MBA, CIC. Maintained Low Rate of Catheter-Related Bloodstream Infections (CR-BSIs) After Discontinuation of a Luer Access Device (LAD) at an Academic Medical Center. Poster presented at the annual Association for Professionals in Infection Control and Epidemiology (APIC) Conference 2010, Abstract 4-028.
6. Data on file at ICU Medical. Microbial Ingress Study on Clave Technology Study commissioned by ICU and conducted by Alcami, 2016.
7. Data on file at ICU Medical. Microbial Ingress Study on Neutron Connector. Study commissioned by ICU and conducted by Alcami, 2017.
8. Observational In-Vivo Evaluation of the Neutron™ Needlefree Catheter Patency Device and its Effects on Catheter Occlusions in a Home Care Setting, 2011
9. Bouza E, Munoz P, Lopez-Rodriguez J, et al. A needleless closed system device (Clave™) protects from intravascular catheter tip and hub colonization: a prospective randomized study. *J Hosp Infect*. 2003; 54:279-287.
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11. Breznock EM, DVM, PhD, Diplomate ACVS, Sylvia CJ, DVM, MS, BioSurg, Inc. The in vivo evaluation of the flushing efficiency of different designs of clear needlefree connectors, March 2011.
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