



# CitraSeal®

CENTRAL VENOUS CATHETER LOCK SOLUTION  
FOR HEMODIALYSIS 4% | 30% | 46.7%

# QUICK, EASY AND SAFE

## CitraSeal® CATHETER LOCK SOLUTION ANTICOAGULANT, ANTIBIOFILM AND ANTIMICROBIAL

Although the use of arteriovenous fistulas and grafts is recommended in several nephrology guidelines on dialysis treatments, the use of central venous catheters (CVC) for extracorporeal blood purification is often inevitable. However, use of CVCs for hemodialysis is associated with high rates of thrombus-related dysfunction and infections due to colonization of dialysis catheters and the surrounding tissues. Subsequently, catheter-related blood-stream infections (CRBSI) may occur.<sup>1</sup> CitraSeal, a heparin- and antibiotic-free, trisodium citrate catheter lock solution, comes in three different concentrations. Depending on the used citrate concentration, CitraSeal reduces CRBSI, biofilm formation and catheter clotting.

CitraSeal 4% effectively helps to prevent catheter clotting and therefore maintains catheter patency between dialysis treatments.<sup>2</sup> The use of heparin as a catheter lock solution in catheter patients becomes unnecessary, reducing the risk of heparin-induced thrombocytopenia (HIT).<sup>3, 4, 5</sup>

CitraSeal 30% and 46.7% offer the same anticoagulatory characteristics as CitraSeal 4%. In addition, they show antimicrobial activity and sustainable reduction in biofilm formation, which is associated with reduced catheter safety and performance.<sup>5, 6</sup> Thus, CitraSeal is effective against bacteria such as *Staphylococcus aureus*, *Staphylococcus epidermidis* and more.<sup>5</sup>



DO YOU WANT TO LEARN MORE ABOUT  
CitraSeal CATHETER LOCK SOLUTION?

Scan the QR code to explore CitraSeal.  
You can download a QR code reader to your  
mobile phone at: [www.i-nigma.mobi](http://www.i-nigma.mobi)

CitraSeal®  
Your effective and reliable barrier against catheter  
dysfunction, no matter what  
CLOTING, BIOFILM, INFECTIONS





### Mini-Plasco® Connect

- Allows needle-free connection
- Easy withdrawal of solution

### CitraSeal® – PORTFOLIO

#### Application, CitraSeal® 4%

CitraSeal 4% is used as a lock solution for central venous catheters for hemodialysis. It is instilled into the catheter lumen between treatments to prevent:

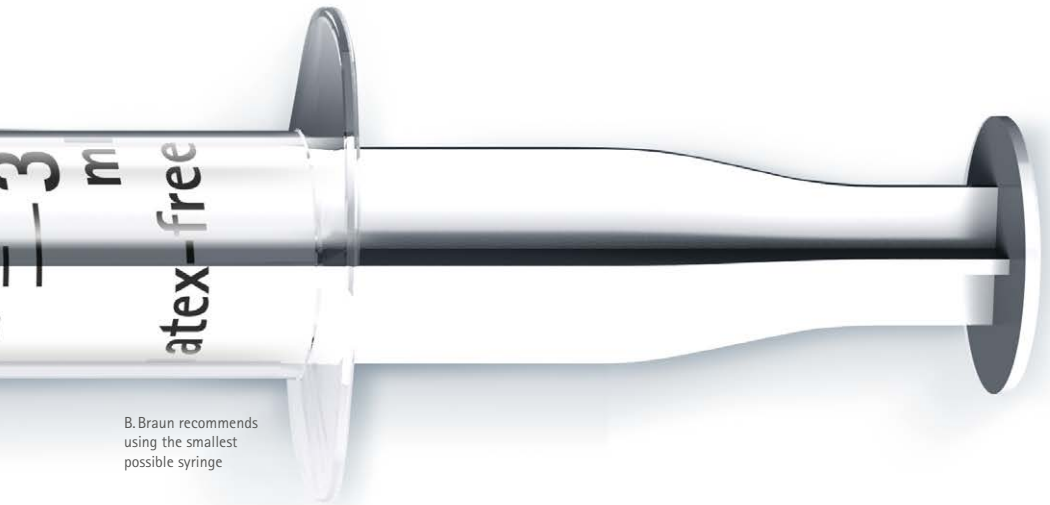
- Clotting of blood in the lumen (anticoagulant)

#### Application, CitraSeal® 30%, 46.7%

CitraSeal 30% and 46.7% are used as lock solutions for central venous catheters for hemodialysis. They are instilled into the catheter lumen between treatments to prevent:

- Clotting of blood in the lumen (anticoagulant), and to reduce the risk of:
  - Bacterial infection as a consequence of bacteriostatic effect in the lumen (antimicrobial)<sup>8</sup>
  - Biofilm formation by bacteriostatic/levurostatic effect in the lumen (antibiofilm)<sup>8</sup>

Please follow Instructions for Use of CitraSeal 30% and CitraSeal 46.7% accordingly.



B. Braun recommends  
using the smallest  
possible syringe

## Mini-Plasco® Connect – A NEW STANDARD IN SAFETY AND USABILITY

CitraSeal comes in the well-established Mini-Plasco Connect plastic ampoules. Every day, numerous procedures are performed during patient care. Plastic ampoules add safety and convenience to complement increased treatment outcomes and health-care worker safety. Its cutting-edge design, featured a Luer connector and a twist-off cap

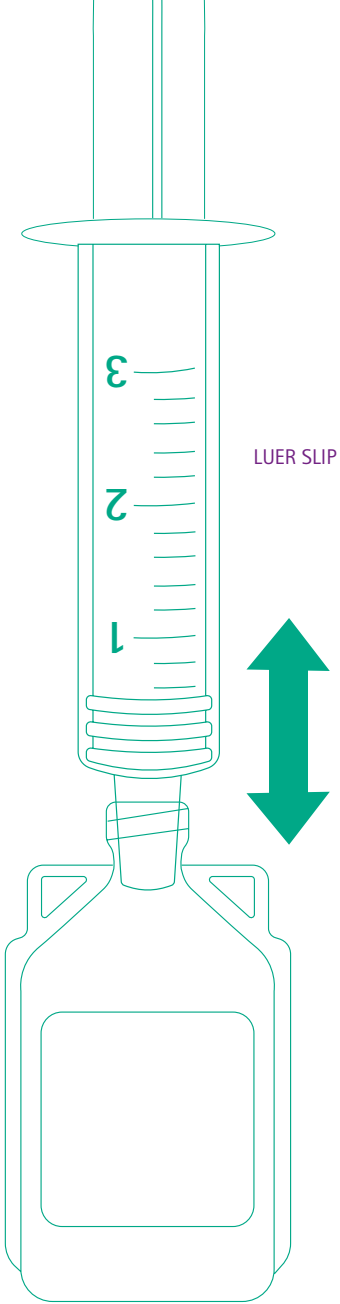
with integrated finger stopper, sets new standards in:

- preventing microbial contamination;
- eliminating particle contamination;
- protection against sharps injuries,

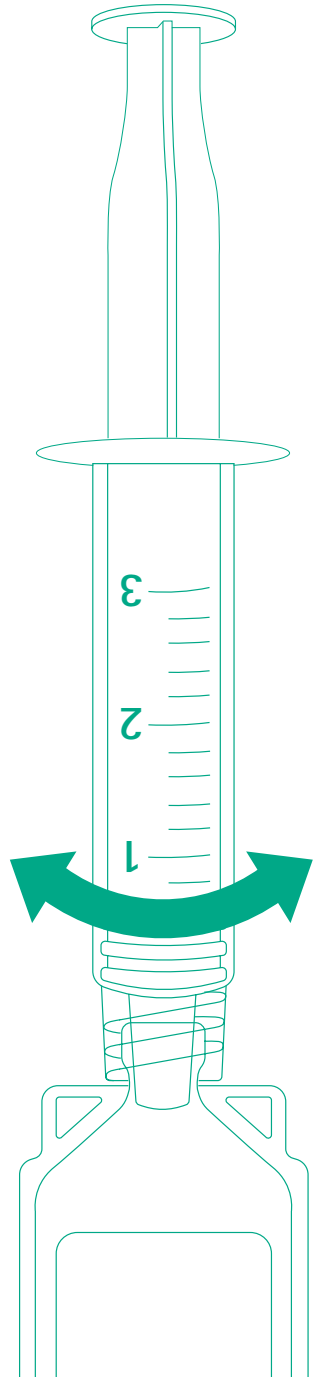
which makes Mini-Plasco Connect a safe, easy and versatile source for sterile solutions, such as CitraSeal.

### Benefits of Mini-Plasco® Connect:

Shatterproof, needle free, cut free, contamination free, vent free, PVC free, DEHP free, latex free, recyclable



LUER LOCK



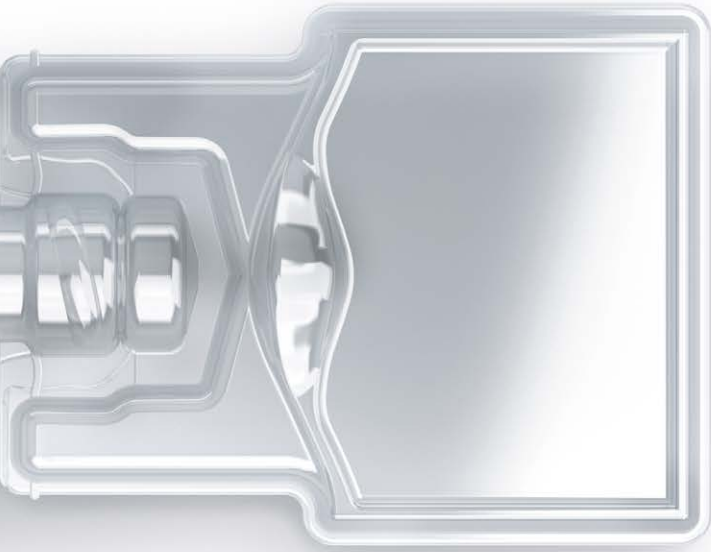


A clear distinction between labels prevents medication errors.



## CitraSeal® – AT A GLANCE

Art. no.	Product name	Packaging unit
9693	CitraSeal 4% MPC 5 ml	20 units per box
9694	CitraSeal 30% MPC 5 ml	20 units per box
9695	CitraSeal 46.7% MPC 5 ml	20 units per box



## Benefits of CitraSeal®

### CitraSeal® 4%

- Maintains central venous catheter patency<sup>2</sup>
- Avoids heparin administration as catheter lock solution<sup>4</sup>
- Prevents heparin-associated bleeding complications<sup>4</sup>
- Viable alternative for patients with heparin-induced thrombocytopenia (HIT syndrome)<sup>4</sup>

### CitraSeal® 30%, 46.7%

- Reduced risk of catheter-related bacteremia (CRB) compared to heparin<sup>6,7</sup>
- Reduces biofilm formation (*S. aureus*)<sup>3</sup>
- Increases catheter lifetime compared to heparin<sup>5,6</sup>
- Improves maintenance of central venous catheter patency<sup>2</sup>
- Avoids heparin-associated bleeding complications<sup>4</sup>
- Avoids heparin administration as catheter lock solution<sup>4</sup>
- Viable alternative for patients with heparin-induced thrombocytopenia (HIT)<sup>4</sup>

B. Braun Avitum AG | Schwarzenberger Weg 73-79 | 34212 Melsungen | Germany  
Tel. +49 5661 71-0 | [dialysis@bbraun.com](mailto:dialysis@bbraun.com) | [www.bbbraun-dialysis.com](http://www.bbbraun-dialysis.com)

#### REFERENCES

<sup>1</sup> USRDS Annual Data Report Volume 2: ESRD in the United States, [www.usrds.org/2015/download/vol2\\_USRDS\\_ESRD\\_15.pdf](http://www.usrds.org/2015/download/vol2_USRDS_ESRD_15.pdf)

<sup>2</sup> MacRae JM, Dojcinovic I, Djurdjev O, Jung B, Shalansky S, Levin A, Kiaii M. Citrate 4% versus heparin and the reduction of thrombosis study, *Clin J Am Soc Nephrol*. 2008 Mar;3(2):369-74

<sup>3</sup> Shanks RM, Sargent JL, Martinez RM et al. Catheter lock solutions influence staphylococcal biofilm formation on abiotic surfaces. *Nephrol Dial Transplant*. 2006; 21: 2247-2255

<sup>4</sup> Grudzinski L, Quinan P, Kwok S, Pierratos A. Sodium citrate 4% locking solution for central venous dialysis catheters: An effective, more cost-efficient alternative to heparin. *Nephrol Dial Transplant*. 2007 Feb;22(2):471-6

<sup>5</sup> Weijmer MC, Debets-Ossenkopp YJ, Van De Vondervoort FJ, ter Wee PM. Superior antimicrobial activity of trisodium citrate over heparin for catheter locking. *Nephrol Dial Transplant*. 2002 Dec;17(12):2189-95

<sup>6</sup> Weijmer MC, van den Dorpel MA, Van de Ven PJ, ter Wee PM, van Geelen JA, Groeneveld JO, van Jaarsveld BC, Koopmans MG, le Poole Cy, Schrandt-Van der Meer AM, Siegert CE, Stas KJ. CITRATE Study Group. Randomized, clinical trial comparison of trisodium citrate 30% and heparin as catheter-locking solution in hemodialysis patients. *J Am Soc Nephrol*. 2005 Sep;16(9):2769-77

<sup>7</sup> Winnett G, Nolan J, Miller M, Ashman N. Trisodium citrate 46.7% selectively and safely reduces staphylococcal catheter-related bacteraemia. *Nephrol Dial Transplant*. 2008 Nov;23(11):3592-8

<sup>8</sup> Data on file, tested in-vitro for: Bacteria: *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Enterococcus hirae* (46.7% only), *Escherichia coli*, *Pseudomonas aeruginosa* - fungus: *Candida albicans*