



# BD Nexiva™ Diffusics™ Closed IV Catheter System

## Frequently asked questions

### Power injection

**1. What psi setting can I use?**

All gauge sizes of the BD Nexiva™ Diffusics™ closed IV catheter system are suitable for use with power injectors set to a maximum pressure of 325 psi.

**2. What contrast media can I use with this device?**

The flow rates listed on the device are acceptable with all contrast media at a viscosity of less than or equal to 27.5 cP. As of June 2019, we are not aware of any contrast media available for sale with a viscosity higher than 27.5 cP at room (20°C) or body (37°C) temperature.

**3. Will the diffusion holes break apart or fail during power injection?**

The tip design has been optimized for flow diffusion and tip strength. The tip integrity will not be compromised when the device is used with a power injector pressure limit set up to 325 psi.

**4. How does the device handle the indicated flow rates for the 22- and 24-gauge sizes (which are much higher compared to a standard non-diffused catheter)?**

In-vitro studies verified that the smaller gauge sizes of the BD Nexiva™ Diffusics™ closed IV catheter system can both withstand and deliver the indicated flow rates with the power injector pressure limit set up to 325 psi. The diffusion tip technology reduces the forces that can cause catheter motion in the vein (compared to a non-diffusion tip IV catheter).

**5. Will the BD Nexiva™ Diffusics™ closed IV catheter system decrease the risk of extravasation?**

There are many factors that can contribute to extravasation. In-vivo models show that the diffusion tip reduces the forces that can cause catheter motion in the vein (compared to a non-diffusion tip IV catheter), which could reduce extravasations resulting from the catheter backing out of the vein during high pressure injection. Actual clinical outcomes will vary depending on use. Extravasation from improper catheter placement or vein damage will not be mitigated by the BD Nexiva™ Diffusics™ closed IV catheter system.

**6. Why does the Luer adapter look different?**

The Luer adapter at the end of the extension set was specifically designed to help clinicians attach a coiled power injection set or an IV line securely and confidently. It allows the clinician to connect away from the IV insertion site, which may minimize catheter movement. The Luer adapter also indicates the maximum flow rate and pressure setting.



**7. How can I tell the gauge size of a BD Nexiva™ Diffusics™ closed IV catheter system that has been placed in a patient?**

The BD Nexiva™ Diffusics™ closed IV catheter system stabilization platform and Luer connector are color coded to indicate catheter gauge size in accordance with ISO 10555-5: 18 G = green; 20 G = pink; 22 G = blue; and 24 G = yellow.

**8. Are the gravity flow rates with the BD Nexiva™ Diffusics™ closed IV catheter system faster than other catheters of the same gauge size?**

While the diffusion tip was designed to enhance flow rates during power injection, the gravity flow rates are improved (compared to a non-diffusion tip IV catheter) depending on gauge size and catheter type.

**9. Can needle-free connectors be used with the system?**

Yes. Any type of needle-free connector with an ISO-compliant Luer connection can be used with the system; however, it is important to confirm the capability of the connector to withstand power injection.

**Diffusion tip**

**10. How does the diffusion tip reduce catheter motion during power injection?**

As the fluid flows through the catheter during power injection, forces on the IV catheter walls result in increased curvature and bend. In these scenarios, the diffusion tip reduces catheter recoil to help stabilize the position of the catheter (compared to a standard non-diffused tip IV catheter).

**11. How will the diffusion tip design impact blood return along the catheter (BD Instaflash™ needle technology)?**

Blood return can still be visualized along the catheter. Once the needle penetrates the vessel, blood flows up the needle, out the notch in the needle and up the space in between the catheter and needle. The diffusion holes do not interfere with this feature.

**General infusion use**

**12. Can the BD Nexiva™ Diffusics™ closed IV catheter system be used for both general infusions and/or power injection?**

Yes. The BD Nexiva™ Diffusics™ closed IV catheter system can be used for administration of fluids and power injection of contrast media.

**13. Does the diffusion tip affect insertion performance?**

No. BD engineers were able to create a precision design that maintains the tip integrity and insertion characteristics that you experience in a standard non-diffusion tip IV catheter.

**14. When drawing blood, will there be increased hemolysis versus a standard non-diffusion tip IV catheter?**

Many factors can impact hemolysis, but in-vitro models demonstrate that the tip design does not contribute to hemolysis any more so than a catheter without a diffusion tip. Actual clinical results may vary.



**15. Can I use the BD Nexiva™ Diffusics™ closed IV catheter system to infuse fluids, medications and blood similar to other peripheral IV catheters?**

Yes. The BD Nexiva™ Diffusics™ closed IV catheter system meets all the same performance criteria important for use outside of CT as other peripheral IV catheters.

**16. Is the BD Nexiva™ Diffusics™ closed IV catheter system PVC, DEHP and latex free?**

These substances are not part of the material formulation of the BD Nexiva™ Diffusics™ closed IV catheter system.

**Best practices**

**17. How does this closed IV catheter design meet clinical best practices?**

The closed IV catheter is designed to keep blood contained within the device during insertion. It allows for access away from the insertion site, which may minimize irritation to the vessel related to catheter movement. It may be used in conjunction with the specially designed dressing for use with the BD Nexiva™ closed IV catheter system, which has been shown to provide stabilization,<sup>1</sup> and is recommended by both the Infusion Therapy Standards of Practice and the CDC for peripheral IV catheters.<sup>2,3</sup>

**18. How is the BD Nexiva™ Diffusics™ closed IV catheter system different from the BD Nexiva™ closed IV catheter system?**

The BD Nexiva™ Diffusics™ closed IV catheter system has three laser-cut, teardrop-shaped holes positioned near the catheter tip and a strengthened design that enables use with power injector set to a maximum pressure of 325 psi. Furthermore, the 24 gauge BD Nexiva™ Diffusics™ system is power-injectable.

**19. What is the catheter material?**

The catheter material is BD Vialon™ catheter material, which is a unique, proprietary catheter material developed specially for vascular access. Catheters made with BD Vialon™ catheter material soften up to 70% in the vein, enabling longer dwell times<sup>4\*</sup> and reducing the chance of mechanical phlebitis by up to 50%<sup>4</sup> compared to PU and FEP catheters tested in reference study.

**20. Can I use the BD Nexiva™ Diffusics™ closed IV catheter system with smaller veins compared to my current IV catheter?**

The broad range of flow rates offered by the BD Nexiva™ Diffusics™ closed IV catheter system can give you options in deciding the best course of patient care, but site selection is left up to the clinician.

**Pressure limiting**

**21. How will the BD Nexiva™ Diffusics™ closed IV catheter system affect the pressure graph on my power injector?**

The diffusion holes have a slight impact on reducing that pressure, but the effect is small compared to other factors like gauge size, temperature of contrast media, length of tubing and add-on devices. When downsizing to a smaller gauge IV catheter (e.g., from 20 G to 22 G), the power injector will exert more pressure to achieve a given flow rate. Any factors that make the tubing (system) longer or narrower will create more pressure in the system (system pressure), which is shown on the injector control monitor in a pressure graph.

## 22. What effect does the diffusion tip design have?

The unique diffusion tip design reduces the potential for the catheter to move or whip around in the vein. It also reduces the force of contrast media exiting the catheter tip and impacting the vein walls. This force of the contrast exiting the catheter (jet pressure) is different than the pressure chart shown on the power injector control display (system pressure). While there is a slight reduction in system pressure, the main benefit of the diffusion technology is the reduction in jet pressure. These are different forces. The diffusion holes do allow smaller catheters to be used at high flow rates (e.g., 22 G at 6.5 mL/sec), but they have little effect on system pressure. Other factors like extension tubing and contrast warming may need to be assessed to reduce system pressure.

## 23. How will downsizing to a smaller gauge catheter affect system pressure?

At a given flow rate, using a smaller gauge IV catheter will increase the pressure at the power injector. For example, if the pressure graph shows 215 psi with an 18-gauge catheter, the system pressure may go up to 230 psi when using a 20-gauge catheter. This type of pressure increase was measured in a 2014 study where researchers found that when injecting at 5-7 mL/sec with a 20-gauge BD Nexiva™ Diffusics™ closed IV catheter system, the peak pressures measured at the power injector were ~15 psi greater compared with a standard 18 gauge catheter. However, in this study, the pressure setting of 325 psi was still not exceeded, and they were able to successfully complete the procedures using a smaller gauge catheter.<sup>5</sup>

## 24. What can I do to reduce my likelihood of hitting the pressure limit?

Warming the contrast media will play a significant role in reducing system pressure. Other factors include the type of add-on devices and the connection tubing between the power injector syringe and the catheter. Both the length and the inner diameter of this tubing can affect the system pressure seen on the power injector control panel. Utilizing excessively long tubing such as 90 inches, or even using two tubing sets connected together, will increase the system pressure. Also, certain manufacturers offer tubing of shorter lengths such as 48 inches, as well as 60-inch coiled tubing, that have a larger inner diameter, which can reduce system pressure.

## 25. What does the listed flow rate on the device mean?

The labeled flow rate denotes the maximum flow rate at which the integrity of the catheter, as well as the stability of the catheter, are maintained. The ability to achieve the listed flow rate is dependent on many factors. Due to the variety of power injector brands, models, contrast media viscosity and temperature, pressure settings and connection tubing used globally, we cannot predict which combinations will be pressure limiting.

## Rapid infusers

### 26. Can the BD Nexiva™ Diffusics™ closed IV catheter system be used with rapid infusers?

BD conducted testing with the Belmont® Rapid Infuser system comparing flow rates against a standard IV catheter at a maximum pressure of 300 mm Hg and found no significant differences with 18- and 20-gauge catheters. The 22-gauge BD Nexiva™ Diffusics™ closed IV catheter system offers a 56% higher flow rate compared to a 22-gauge standard catheter.<sup>6</sup>

## References

1. Bausone-Gazda D, Lefaiver CA, Walters SA. A randomized controlled trial to compare the complications of 2 peripheral intravenous catheter-stabilization systems. *J Infus Nurs.* 2010;33(6):371-384.
2. Infusion Nurses Society. Infusion Therapy Standards of Practice. *J Infus Nurs.* 2016;39(1S).
3. O'Grady NP, Alexander M, Burns LA, et al. Guidelines for the prevention of intravascular catheter-related infections. *CDC.* 2011.
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5. Johnson PT, Christensen GM, Fishman EK. IV contrast administration with dual source 128-MDCT: a randomized controlled study comparing 18-gauge nonfenestrated and 20-gauge fenestrated catheters for placement success, infusion rate, image quality and complications. *Am J Roentgenol.* 2014;202(6):1166-70.
6. Performance of the BD Nexiva™ Diffusics™ closed IV catheter system for radiographic power injection with the Belmont® Rapid Infuser