



Percutaneous Sheath Introducer Product

Safety and Efficacy Considerations:

Do not use if package has been previously opened or damaged.

Warning: Prior to use read all package insert warnings, precautions, and instructions. Failure to do so may result in severe patient injury or death.

The product is designed for single use only. Do not resterilize or reuse. Do not alter sheath or any other kit/set component during insertion, use, or removal.

Procedure must be performed by trained personnel well versed in anatomical landmarks, safe technique, and potential complications.

Indications for Use:

The Arrow® Percutaneous Sheath Introducer permits venous access and catheter introduction to the central circulation.

Contraindications:

None known.

Warnings and Precautions:*

1. **Warning:** Practitioners must be aware of complications associated with percutaneous sheath introduction including vessel wall perforation,¹⁷ pleural and mediastinal injuries,^{1,13} air embolism,^{6,9,12,14} sheath embolism, thoracic duct laceration,³ bacteremia, septicemia, thrombosis,⁴ inadvertent arterial puncture,⁷ nerve damage, hematoma, hemorrhage,⁵ dysrhythmias, and occlusion.
2. **Warning:** Do not apply excessive force in removing guide wire, dilator, or sheath. If withdrawal cannot be easily accomplished, a chest x-ray should be obtained and further consultation requested.
3. **Warning:** The practitioner must be aware of potential air embolism associated with leaving open needles, sheaths, or catheters in venous puncture sites or as a consequence of inadvertent disconnects. To lessen the risk of disconnects, only securely tightened Luer-Lock connections should be used with this device. Follow hospital protocol for all sheath and side port maintenance to guard against air embolism.
4. **Warning:** Hemostasis valve must be occluded at all times to minimize the risk of air embolism or hemorrhage. If catheter introduction is delayed, or catheter is removed, temporarily cover valve opening with sterile-gloved finger until catheter or obturator is inserted. Use Arrow® obturator, either included with this product or sold separately, as dummy catheter with hemostasis valve/side port assembly and sheath. This will ensure that leakage does not occur and inner seal is protected from contamination.¹⁴
5. **Warning:** Passage of guide wire into right heart can cause dysrhythmias, right bundle branch block,⁸ and a perforation of the vessel wall, atrial or ventricular.
6. **Warning:** Practitioners must be aware of the potential for entrapment of guide wire by any implanted device in the circulatory system (ie. vena cava filters, stents). Review patient's history before catheterization procedure to assess for possible implants. Care should be taken regarding the

length of spring-wire guide inserted. It is recommended that if patient has a circulatory system implant, catheter procedure be done under direct visualization to minimize the risk of guide wire entrapment.²

7. **Warning:** Due to the risk of exposure to HIV (Human Immunodeficiency Virus) or other blood borne pathogens, health care workers should routinely use universal blood and body-fluid precautions in the care of all patients.
8. **Precaution:** Do not suture directly to outside diameter of sheath to minimize the risk of cutting or damaging sheath or impeding sheath flow.
9. **Precaution:** Indwelling sheaths should be routinely inspected for desired flow rate, security of dressing, correct position and for proper Luer-Lock connection.
10. **Precaution:** Maintain insertion site with regular meticulous redressing using aseptic technique.
11. **Precaution:** Alcohol and acetone can weaken the structure of polyurethane materials. Check ingredients of prep sprays and swabs for acetone and alcohol content.
Acetone: Do not use acetone on sheath surface. Acetone may be applied to skin but must be allowed to dry completely prior to applying dressing.
Alcohol: Do not use alcohol to soak sheath surface or to restore sheath patency. Care should be taken when instilling drugs containing high concentration of alcohol. Always allow alcohol to dry completely prior to applying dressing.
12. **Precaution:** Some disinfectants used at the sheath insertion site contain solvents, which can attack the sheath material. Assure insertion site is dry before dressing.
13. **Precaution:** Do not inflate balloon of flow-directed catheter prior to insertion through catheter contamination shield to minimize the risk of balloon damage.
14. **Precaution:** Properly dispose of sharps in sharps container in accordance with state/federal OSHA standards for blood borne pathogens and/or institutional policy.

A Suggested Procedure:

Use sterile technique.

1. **Precaution:** Place patient in slight Trendelenburg position as tolerated to reduce the risk of air embolism. If femoral approach is used, place patient in supine position.
2. Prep area of anticipated venipuncture.
3. Drape puncture site as required.
4. Perform skin wheal using desired needle. In kits where provided, the SharpsAway II™ Locking Disposal Cup is used for disposal of needles (15 Ga. - 30 Ga.).
 - Using one-handed technique, firmly push needles into disposal cup holes (refer to Fig. 1).

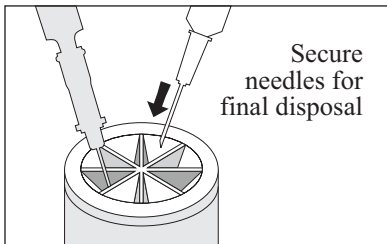


Fig. 1

- Once placed into disposal cup, needles will be automatically secured in place so that they cannot be reused.
- Discard entire cup, at completion of procedure, into an approved sharps container.

Precaution: Do not attempt to remove needles that have been placed into cup. These needles are secured in place. Damage may occur to needles if they are forced out of disposal cup.

Where provided, a foam SharpsAway® system may be utilized by pushing needles into foam after use. **Precaution: Do not reuse needles after they have been placed into the foam cup. Particulate matter may adhere to needle tip.**

5. Prepare flow-directed catheter according to manufacturer's instructions. Wet balloon with flush solution to facilitate passage through valve of catheter contamination shield. **Precaution: Do not inflate balloon prior to insertion through catheter contamination shield to minimize the risk of balloon damage.**
6. Ensure that double TwistLock™ of catheter contamination shield is fully opened (refer to Fig. 2).

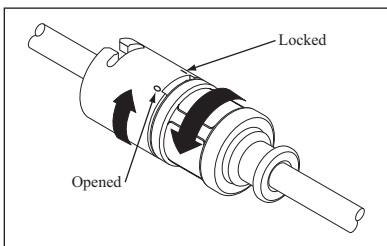


Fig. 2

Insert tip of desired catheter through proximal end of catheter contamination shield. Advance catheter through tubing and hub at other end (refer to Fig. 3).

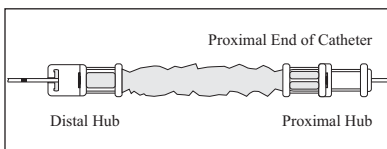


Fig. 3

7. Slide entire catheter contamination shield to proximal end of catheter.
8. If flow directed catheter is used, inflate and deflate balloon with syringe to ensure integrity. **Precaution: Do not exceed balloon catheter manufacturer's recommended volume.** Place catheter and catheter contamination shield on sterile field awaiting final sheath placement.
9. Insert entire length of dilator through hemostasis valve into sheath pressing hub of dilator firmly into hub of hemostasis valve/side port assembly. Place assembly on sterile field awaiting final sheath placement.
10. Insert introducer needle with attached Arrow® Raulerson Syringe into vein and aspirate. (If larger introducer needle is used, vessel may be pre-located with 22 Ga. locator needle and syringe.) Remove locator needle.

Alternate Technique:

Catheter/needle may be used in the standard manner as alternative to introducer needle. If catheter/needle is used, Arrow® Raulerson Syringe will function as a standard syringe, but will not pass spring-wire guide. If no free flow of venous blood is observed after needle is removed, attach syringe to catheter and aspirate until good venous blood flow is established. **Precaution: The color of blood aspirated is not always a reliable indicator of venous access.¹⁰ Do not reinsert needle into introducer catheter.**

11. Because of the potential for inadvertent arterial placement, one of the following techniques should be utilized to verify venous access. Insert fluid primed blunt tip transduction probe into rear of plunger and through valves of Arrow® Raulerson Syringe. Observe for central venous placement via a wave form obtained by a calibrated pressure transducer. Remove transduction probe (refer to Fig. 4).

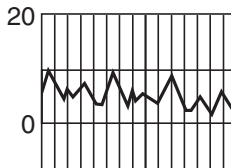


Fig. 4

Alternate Technique:

If hemodynamic monitoring equipment is not available to permit transducing a central venous wave form, check for pulsatile flow by either using the transduction probe to open syringe valving system or by disconnecting syringe from needle. Pulsatile flow is usually an indicator of inadvertent arterial puncture.

12. Using the two-piece Arrow Advancer™, advance spring-wire guide through syringe into vein. **Warning: Aspiration with spring-wire guide in place will cause introduction of air into syringe.** **Precaution: To minimize the risk of leakage of blood from syringe cap do not reinfuse blood with spring-wire guide in place.**

Two-Piece Arrow Advancer™ Instructions for Use:

- Using your thumb, straighten the "J" by retracting spring-wire guide into the Arrow Advancer™ (refer to Figs. 5, 6).

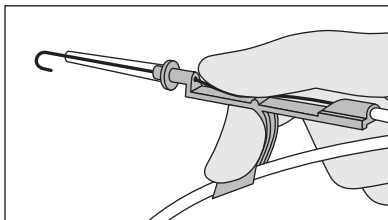


Fig. 5

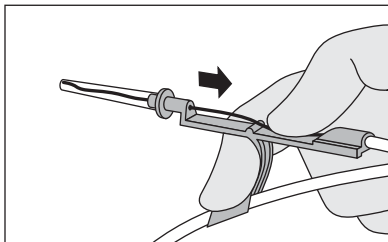


Fig. 6

When tip is straightened, spring-wire guide is ready for insertion. Centimeter marks on guide wire are referenced from “J” end. One band indicates 10 cm, two bands 20 cm, and three bands 30 cm.

Introducing the Spring-Wire Guide:

- Place tip of Arrow Advancer™ – with “J” retracted – into the hole in rear of Arrow® Raulerson Syringe plunger (refer to Fig. 7).

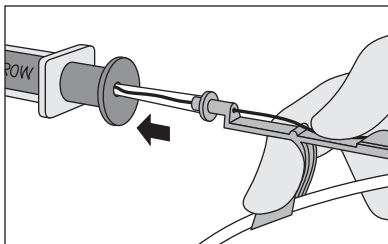


Fig. 7

- Advance spring-wire guide into syringe approximately 10 cm until it passes through syringe valves (refer to Fig. 8).

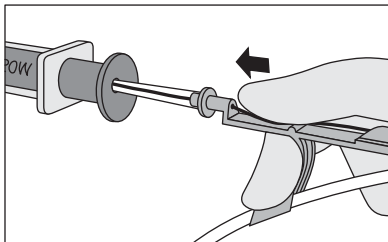


Fig. 8

- Raise your thumb and pull Arrow Advancer™ approximately 4 - 8 cm away from syringe. Lower thumb onto Arrow Advancer™ and while maintaining a firm grip on spring-wire guide, push assembly into syringe barrel to further advance spring-wire guide. Continue until spring-wire guide reaches desired depth (refer to Fig. 9).

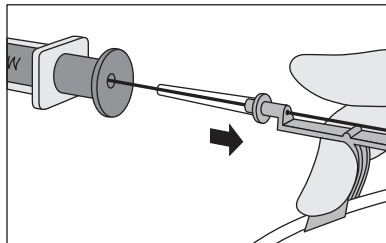


Fig. 9

Alternate Technique:

If a simple straightening tube is preferred, the straightening tube portion of the Arrow Advancer™ can be disconnected from the unit and used separately.

Separate the Arrow Advancer™ tip or straightening tube from blue Arrow Advancer™ unit. If “J” tip portion of spring-wire guide is used, prepare for insertion by sliding the plastic tube over “J” to straighten. The spring-wire guide should then be advanced in routine fashion to desired depth.

- Advance guide wire until triple band mark reaches rear of syringe plunger. Advancement of “J” tip may require a gentle rotating motion. **Warning: Do not cut spring-wire guide to alter length. Do not withdraw spring-wire guide against needle bevel to minimize the risk of possible severing or damaging of spring-wire guide.**
- Hold spring-wire guide in place and remove introducer needle and Arrow® Raulerson Syringe (or catheter). **Precaution: Maintain firm grip on spring-wire guide at all times.** Use centimeter markings on spring-wire guide to adjust indwelling length according to desired depth of indwelling sheath placement.
- Enlarge cutaneous puncture site with cutting edge of scalpel positioned away from the spring-wire guide. **Precaution: Do not cut guide wire. Retract scalpel in the protected position (refer to Fig. 10).**

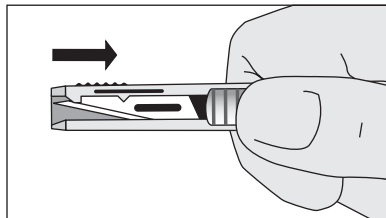


Fig. 10

- Thread tapered tip of dilator/sheath/valve assembly over spring-wire guide. Grasping near skin, advance assembly with slight twisting motion to a depth sufficient to enter vessel. Dilator may be partially withdrawn to facilitate advancement of sheath through tortuous vessel. **Precaution: Do not withdraw dilator until sheath is well within vessel to minimize the risk of damage to sheath tip.**

17. Advance sheath/valve assembly off dilator into vessel, again grasping near skin and using slight twisting motion.
18. To check for proper sheath placement within vessel, remove side port end cap and attach syringe for aspiration. Hold sheath/valve assembly in place and withdraw spring-wire guide and dilator sufficiently to allow venous blood flow to be aspirated into side port. **Precaution: Maintain firm grip on spring-wire guide at all times.**
19. Holding sheath/valve assembly in place, remove guide wire and dilator as a unit. Place sterile-gloved finger over hemostasis valve. **Warning: To minimize the risk of possible vessel wall perforation do not leave dilator in place as an indwelling catheter. Warning: Although incidence of spring-wire guide failure is extremely low, practitioner should be aware of the potential for breakage if undue force is applied to the wire.** Flush and connect side port to appropriate line as necessary.

20. Feed catheter through sheath/valve assembly into vessel. Advance catheter to desired position. **Warning: Hemostasis valve must be occluded at all times to minimize the risk of air embolism or hemorrhage. If catheter introduction is delayed, or catheter is removed, temporarily cover valve opening with sterile-gloved finger until catheter or obturator is inserted. Use Arrow® obturator, either included with this product or sold separately, as dummy catheter with hemostasis valve/side port assembly and sheath. This will ensure that leakage does not occur and inner seal is protected from contamination.**¹⁴

21. Hold catheter in place and reposition catheter contamination shield so that distal hub is approximately five inches (12.7 cm) from hemostasis valve/side port assembly (refer to Fig. 11).

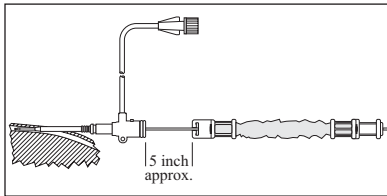


Fig. 11

22. Hold proximal hub of catheter contamination shield in place. Disengage distal hub from inner feed tube by pulling forward. Advance distal hub forward toward hemostasis valve/side port assembly. Hold assembly in place (refer to Fig. 12).

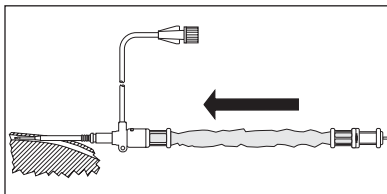


Fig. 12

23. Press distal hub of catheter contamination shield over assembly cap. Twist to lock (refer to Fig. 13).

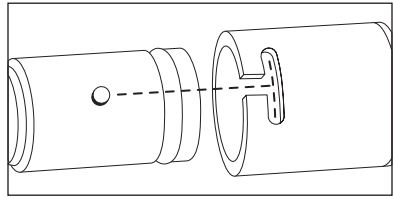


Fig. 13

- Orient slot in hub with locking pin on assembly cap.
 - Slide hub forward over cap and twist.
24. While maintaining catheter position, twist upper half of distal hub in clockwise direction to lock catheter in place. Reposition proximal end of catheter shield as desired. Twist upper and lower halves in opposite directions to lock in place. Test adapter by gently tugging on catheter to ensure a secure grip on catheter (refer to Fig. 14). **Precaution: Do not reposition proximal hub once locked in final position.**

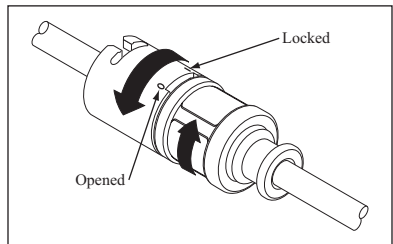


Fig. 14

25. Use suture tab to secure sheath and/or anchor with a purse string suture around sheath suture ring. **Precaution: Do not suture directly to outside diameter of sheath to minimize the risk of cutting or damaging the sheath or impeding sheath flow.**
26. Dress puncture site per hospital protocol. **Precaution: Maintain insertion site with regular, meticulous redressing using aseptic technique.**
27. Record insertion procedure on patient's chart.

Catheter Removal Procedure:

1. **Precaution: Place patient in a supine position.**
2. Remove dressing, if applicable. **Precaution: To minimize the risk of cutting the sheath, do not use scissors to remove dressing.**
3. Twist distal hub of catheter contamination shield to allow removal from locking pin on hemostasis valve/side port assembly. Withdraw catheter from sheath. **Warning: Hemostasis valve must be occluded at all times to minimize the risk of air embolism or hemorrhage.** Temporarily cover valve opening with sterile-gloved finger until catheter or obturator is inserted.

Sheath Removal Procedure:

1. **Precaution: Place patient in a supine position.**
2. Remove dressing, if applicable. **Precaution: To minimize the risk of cutting the sheath, do not use scissors to remove dressing.**
3. If applicable, remove sutures from sheath. **Precaution: Be careful not to cut the sheath.**
4. Withdraw device from sheath. Cover hemostasis valve with sterile-gloved finger. **Warning: Hemostasis valve must be occluded at all times to minimize the risk of air embolism or hemorrhage.**
5. **Warning: Exposure of the central vein to atmospheric pressure may result in entry of air into the central venous system.** Remove sheath slowly, pulling it parallel to skin. As sheath exits site, apply pressure with a dressing impermeable to air, e.g. Vaseline[®] gauze. Because the residual sheath track remains an air entry point until completely sealed, occlusive dressing should remain in place for at least 24-72 hours dependent upon amount of time sheath was indwelling.^{11,15,16,18}
6. Upon removal of sheath, inspect it to make sure entire length has been withdrawn.
7. Document removal procedure.

References:

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- Arrow International, Inc. recommends that the user be acquainted with the reference literature.
- * If you have any questions or would like additional reference information, please contact Arrow International, Inc.
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