

# VENTI-SCAN IV RADIOAEROSOL CONVENIENCE KIT

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## OPERATION MANUAL

177-091  
177-092



**BIODEX**

Part of Mirion Technologies

**Biodex Medical Systems, Inc.**

20 Ramsey Road, Shirley, New York 11967-4704, T: 800 224 6339, T: 631 924 9000 (Int'l)

F: 631 924 8355 Corporate Office, F: 631 924 9241 Radiology & Physical Medicine Sales, E: [info@biodex.com](mailto:info@biodex.com)

# VENTI-SCAN IV RADIOAEROSOL CONVENIENCE KIT

**This manual contains operation procedures for the following Biomed products:**

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|---------|--|
| 177-091 | Venti-Scan IV Radioaerosol Convenience Kit, 12" tubing |
| 177-092 | Venti-Scan IV Radioaerosol Convenience Kit, 24" tubing |

## INTRODUCTION

The Venti-Scan IV Radioaerosol Convenience Kits (#177-091 and #177-092) enhance delivery of radioaerosol by use of a smaller baffle within the nebulizer. The end result is smaller particle size. The kit includes a filter with a contour design. This increases surface area and provides virtually resistance free breathing with exceptional trapping capacity. Used in conjunction with the Venti-Scan IV Shielded Canister (#177-090), the Venti-Scan IV Kit provides superior film studies and lead-shielded protection from top to bottom.

## INSTRUCTIONS FOR USE

1. Remove the Venti-Scan IV shielded canister top.
2. Place lower shield assembly in IV pole mount.
3. Remove the Venti-Scan IV I kit from its packaging.
4. Gently insert the disposable into the canister (you can tilt the disposable toward the patient tube while lowering).

**NOTE:** *The nebulizer injection port should be visible through the canister injection site.*

5. Inject Tc-99m DTPA into the nebulizer injection port. Typically, 40 mCi of Tc-99m is used in approximately 2 mL. Be careful not to push the needle through the back of the injection port elbow.
6. Replace shielded top by aligning large slot with patient breathing tube. Push down on the cover and twist to lock. For maximum shielding, ensure that rotating port on top of cover is fully closed.



**CAUTION:** *Oxygen supply must be turned OFF. Do NOT use a humidified oxygen source.*



**ATTENTION:** *L'alimentation d'oxygène doit être arrêtée. Ne pas utiliser une source d'oxygène humidifiée.*

7. Adjust height of assembly on stand for patient comfort. Explain procedure to the patient. Place disposable gloves on the patient if handling of the tubing will be required by the patient during the study.
8. Place the mouthpiece in the patient's mouth. After ensuring the patient maintains a good seal on the mouthpiece, apply the nose clip and instruct the patient to relax and breathe deeply on the system several times to ensure proper operation and familiarize the patient with the system.
9. Connect one end of O<sup>2</sup> tubing to the O<sup>2</sup> supply and set the flow to 10-11 liters per minute. Confirm that the patient is ready to begin the procedure. Connect the other end of the O<sup>2</sup> tubing to the Venti-Scan IV inlet tube to start the aerosol delivery procedure. **INSTRUCT THE PATIENT TO CONTINUE BREATHING ON THE SYSTEM FOR THREE TO FIVE MINUTES TO ENSURE SUFFICIENT LUNG DEPOSITION.**
10. After allowing enough time to ensure sufficient lung deposition, turn OFF the oxygen (or air). To maximize clearance of any remaining activity in the tubing following inhalation, and to minimize the possibility of inadvertent contamination to the patient and room, instruct the patient to continue breathing for five or six breaths before removing the mouthpiece (you may also instruct the patient to expectorate into a disposable towel to be handled as normal radioactive waste).
11. Once the patient mouthpiece has been removed, remove the nose clip and begin imaging.

**NOTE:** *Imaging may be performed during radioaerosol inhalation.*



**CAUTION:** *To prevent inadvertent contamination of the patient or room, use care and good radiation practice when removing the patient from the system.*



**ATTENTION:** *Pour éviter de contaminer le patient et la pièce, suivre les pratiques usuelles relatives aux rayons X lors de la sortie du patient du système.*



**CAUTION:** *This procedure may NOT be appropriate for uncooperative patients or for patients who cannot maintain a good mouthpiece seal.*



**ATTENTION:** *Cette technique peut ne pas être adaptée à des patients non coopérants ou à des patients ne pouvant pas maintenir une bonne étanchéité sur la pièce buccale.*

12. Disconnect the oxygen tube. Remove the shield assembly from the IV pole mount and transport to a radioactive waste disposal area.

13. Remove the shield top and then remove the disposable kit by tilting the shield over and pressing the button on the bottom of the canister. You may have to press hard on the release button the first time you use the canister. Now gently shake the kit out of the canister without handling it (disposable plastic bag and tie-wrap are supplied for covering the mouthpiece and moving it to the decay barrel). The used circuit contains significant radioactive material. Be certain to use your facility approved procedure for disposal of all radioactive and biohazardous waste.

**NOTE:** *Do not attempt to aid the removal by pulling kit out with your hands. It may cause the kit to separate.*



**CAUTION:** *Do not reuse disposable nebulizer.*



**ATTENTION:** *Ne pas utiliser u humidificateur jetable.*



**CAUTION:** *If patient removes mouthpiece, immediately turn OFF the oxygen supply.*



**ATTENTION:** *Si le patient retire la pièce buccale, arrêter immédiatement l'alimentation oxygène.*

## **SOME TIPS FOR OPTIMUM SCANS**

### **EQUIPMENT**

- If using a tank, replace unit if the remaining pressure drops to 25% of the air/O<sup>2</sup> in the tank.
- If you use wall oxygen, have maintenance check pressure at the wall inlet to ensure you are getting the 30 to 55 psi needed for good particle spallation, (approximately one micron MDD). Be aware that the pressure can drop at times if others are using the system.
- Occasionally check one aerosol unit by putting in 1 mL of water for injection or saline and turning the system ON. You should see a plume of mist reaching three to four inches from the mouthpiece. (You can use the unit with a patient after checking, simply by adding an additional 2 mL of Tc-99m DTPA containing 40 mCi.)
- *Always* inject DTPA *before* turning on air/oxygen.

### **PATIENT CONSIDERATIONS**

- Patients should not smoke for 24 hours prior. (Smoke particles in lungs act as magnets for Tc-99m DTPA and may cause a mottling effect in the scan.)
- Be aware that shallow breathers tend to get more upper airway deposition. Try to have patient take slow, *deep* breaths.
- Patients with false teeth or no teeth, or a large amount of hair in the nose, need to be monitored closely. They may move the mouthpiece around and have mist squirt out sides of mouth, or they may breathe through the nose which reduces the amount going to the lower lungs. Be sure nose is clamped properly.
- If the patient is in a seated position, you may see more radioaerosol deposition in the lower (basal) sections of lung.
- Instruct patients to raise a hand if they want to swallow. Turn the system OFF, then have the patient spit into a napkin or tissue.
- Typically, 40 mCi of Tc-99m DTPA is used in 2 mL volume for either pre or post vents. Remember, only 1 to 3 mCi of Tc-99m DTPA reaches the lungs - the remainder is in the nebulizer or filters out and is discarded.
- The techs get more radiation exposure from the patient's chest walls than from the tubing of the vent device.

### **THE PROCEDURE**

- Try to keep patients as calm as possible. Show them the system and explain how it functions. Let patients know that they'll feel a cool mist of water when they breathe. Assure them that the time will pass quickly. If necessary, add one cc of water and show them how the system works, or allow them to breathe in the system to allay fears.

- *Always* inject Tc-99m DTPA *before* turning on air/oxygen pressure. If not, excessive DTPA can find its way to the bottom of nebulizer, making for an inefficient vent.
- Patients must breathe as deeply as possible for approximately five minutes.
- Take care that patients do not contaminate you or themselves. The gamma camera doesn't differentiate between the activity being counted in the patient's lungs or on the patient's chest.
- Some doctors feel a good vent only requires 200K counts, others want darker images. From *your* perspective, the fewer, the better.
- In emergencies, you can vent with a concentration as low as (18 mCi in 4 cc's.) This may, however, require the patient to breathe a little longer.
- If milking a generator, make certain you have no molly breakthrough.
- Tank pressure is crucial to getting a good scan. Low pressure invariably causes excessive upper air deposition. 100% of all nebulizers are tested to ensure 45 psi of pressure. When the tubing is connected and used by the patient the pressure drops to about 28 psi. This is still ample to get small partial vents (1 to 1.2 micron mass mean aerosolized diameter).

#### **FOR POST PERFUSION VENT SCANS (WHEN INDICATED)**

- Try to reduce the amount of Tc-99m MAA to 1 or 1.5 millicuries.
- Scan from 200K to 300K counts. The image should be clear enough for the doctor to detect defects. (You can develop a 200K - 300K or 500K scan and let the doctor choose which one is preferred.) The fewer the counts, the quicker to get the needed vent counts.
- Following the perfusion study, you can vent in a number of ways:
  - If the patient breathes away from the camera, check the patient's chest wall with a geiger counter. (Make sure the clicker is OFF or you might scare the patient.) This is your baseline count from residual perfusion.
  - Vent the patient for three to five minutes to ensure sufficient lung deposition. Typically, 40 millicuries of Tc-99m DTPA is sufficient. Turn OFF oxygen supply after five minutes and check patient's chest wall. If counts increase by 25% to 50%, you have enough from venting to image.

- If you don't have a geiger counter, vent for five minutes and scan.
- If your final perfusion count rate was 1000 cps, you should be getting 1250 to 1500 cps after venting. By this method you know the air sac side of the lungs received activity. Then proceed to do your total vent count.
- If you vent while the patient is under the camera, breathe the patient for a few minutes and see if the defect starts to fill in. If so, you have your mismatch or possible PE. If not, the patient may have COPD.

**NOTE:** *The camera must not have a cooling fan near the crystal head. If the patient coughs, talks or spits out the mouthpiece, you could flood your crystal head with Tc-99m from the escaping mist plume.*

- Conclusion: Venting an average patient for five to six minutes should deposit enough counts in the air sac side of the lungs to override the counts from the perfusion study. (Using 40 mCi of Tc-99m DTPA injected into the nebulizer.)



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Biodex Medical Systems, Inc., 20 Ramsey Road, Shirley, New York 11967-4704 Tel: 800-224-6339 (Int'l 631-924-9000) Fax: 631-924-9241 [www.biodex.com](http://www.biodex.com).

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For technical assistance email [info@biodex.com](mailto:info@biodex.com)

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