Midmark Recommendations

- The IQcal® 3-Liter Syringe has been manufactured and tested to meet recommended ATS standards.

- The Midmark IQspiro® and IQmark® Digital Spirometer must be calibrated using the supplied calibration syringe adapter.

- Midmark recommends an annual calibration check of the IQcal® 3-Liter Calibration Syringe. For information about receiving an annual calibration check, contact the Midmark Support Services Team at 1-800-624-8950, option 2.

  NOTE: Please retain original packaging materials to expedite the return of your IQcal® 3-Liter Syringe for recalibration or service.

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1. Title: Standardisation of spirometry
   Author(s): Miller MR; Hankinson J; Brusasco V; et al.
   Source: EUROPEAN RESPIRATORY JOURNAL Volume: 26 Issue: 2 Pages: 319-338 DOI: 10.1183/09031936.05.00034805
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A. Intended Use

Volume calibration syringes are designed for testing and calibrating flow measurement devices. These calibration syringes are manually operated by actuating the plunger in and out of the cylinder. The outlet port of the syringe is attached to the device to be tested via the syringe adapter. The calibration syringe when actuated displaces known volumes of air into the flow device. The operator then compares the calibration syringe volume with the flow measurement system to determine accuracy.

B. Instructions for Use

- Connecting the spirometer to the IQcal® 3-Liter Calibration Syringe

  When calibrating your spirometer, it is important to use the syringe adapter that is supplied with the unit.

  - First, remove the plug that has been placed in the outlet port. Do not dispose of the plug as you can utilize it for the recommended leak test.
  - Insert a disposable mouthpiece (DM) in the spirometer and set it aside.
  - Push the large end of the syringe adapter onto the syringe outlet port with enough pressure to ensure a secure, airtight seal.
  - Insert and press the DM that you inserted in the spirometer into the small end of the adapter and ensure a secure, airtight seal.

  NOTE: In order to avoid calibration errors, never attach the syringe directly to the DM without the syringe adapter. Placing the syringe outlet port inside a DM will cause an inaccurate calibration and is not recommended. Also, check that there are no obstructions blocking the airflow of the DM on either end.

  NOTE: The spirometer should be plugged into the computer. Check that the power is on before starting the calibration procedure. If the power is on, a green light will appear right below the DM on the exhalation side of the IQspiro®.
C. Performing the Calibration
• Perform the calibration procedure as outlined in the spirometer’s Operation Manual or spirometer software.

NOTE: Midmark recommends a calibration check of the spirometer daily before use.1

D. Using the IQcal® 3-Liter Calibration Syringe to Calibrate Other Spirometers
• If your spirometer uses a heated pneumotach, it is recommended that the pneumotach be at room (ambient) temperature prior to calibration. Errors may be introduced if the spirometer is calibrated with a warm pneumotach. Refer to your spirometer’s Operation Manual for further details.

If you are calibrating a volumetric spirometer, use of the adapter may not be necessary.

E. Normal Operation of the IQcal® 3-Liter Calibration Syringe
• Never push up or down on the plunger handle; side pressure can cause a break in the air seal of the syringe.

• Push the plunger handle in by applying a smooth direct force to the center of the plunger handle.

• Always move the plunger handle fully from end to end when performing a calibration. You should feel the plunger firmly contact each end of the syringe. Avoid slamming or banging the plunger against the ends.

• If the calibration syringe is dropped or visibly damaged, please contact Midmark for return and repair procedures.

• The calibration syringe should be stored and used in such a way as to maintain the same temperature and humidity of the testing site. This is best accomplished by keeping the calibration syringe in close proximity to the spirometer, but out of direct sunlight and away from heat sources.

F. Leak Test of the IQcal® 3-Liter Syringe
• With the plunger handle pulled all the way out, shut off air flow to the syringe by placing the palm of your hand tightly over the outlet port or shut off air flow by placing the supplied plug in the outlet port.

• Attempt to push the plunger in while shutting off air flow. At the same time, place your ear close to the syringe end plate and listen for any hissing sounds, indicating a leak.

• If there is no movement in the plunger and no hissing sounds, there are no leaks in the syringe.

• If the syringe plunger is able to be pushed in or you hear hissing sounds, you most likely have a leak in the syringe and need to contact Midmark for return authorization and repair.

• Midmark recommends leak testing of the calibration syringe daily before calibrating a spirometer.

G. Cleaning and Maintenance
• Regularly inspect the syringe for damage. If damage is detected, identify and document the damage. Please contact Midmark for return and repair procedures.

• To clean the calibration syringe, use a detergent or soap solution. Typical concentration of detergent is one ounce to 3.8 liters of water.

• With a clean, soft cloth dampened with the detergent solution, wipe down the outside surfaces of the syringe. Do not immerse the syringe in liquid.

• Use a soft cloth to remove any residue and dry the syringe. Dry thoroughly before use.

H. Recalibration
• Midmark recommends an annual calibration check of the IQcal® 3-Liter Calibration Syringe. For information about receiving an annual calibration check, contact the Midmark Support Services Team at 1-800-624-8950, option 2.

I. Warning
• Do not use ethylene oxide, steam sterilize or pasteurize the calibration syringe. This product cannot be sterilized.

• Do not disassemble this product. For service information, contact Midmark.

• Do not operate these syringes at temperatures above 25° or below 15° C.

• It is the user’s responsibility to validate any deviations from these recommended methods of processing.

• Federal law restricts this device to sale by or on the order of a physician.