



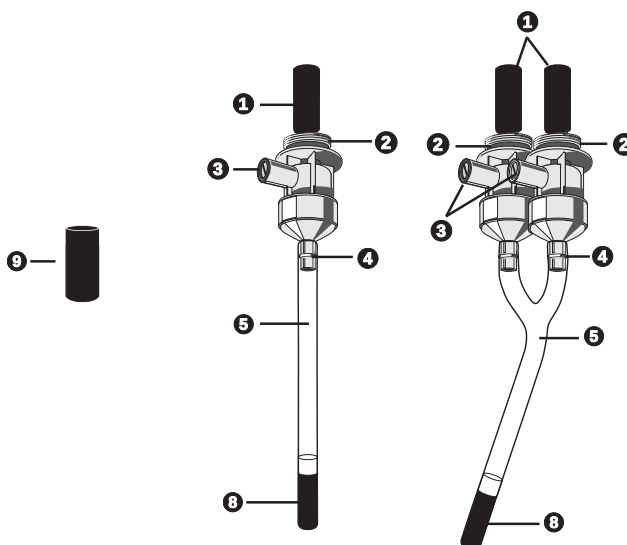
Adjustable Low Flow Tube Holder

The adjustable low flow tube holder is designed to be used for low flow applications from 5 to 500 ml/min using sorbent sample tubes.

- ❶ Port and tube holder (smaller ID rubber sleeve*)
- ❷ Threaded fitting (fits all SKC protective tube covers)
- ❸ Flow adjust screw (needle valve) (1 per port)
- ❹ Outlet (to pump)
- ❺ Tygon® tubing
- ❻ Anti-tamper cover (tri and quad models only)
- ❼ Collar clip (tri and quad models only)
- ❽ Rubber tubing
- ❾ Larger ID rubber sleeve*

Single
Cat. No. 224-26-01

Dual
Cat. No. 224-26-02

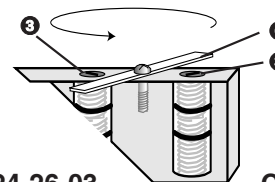


Operation

For Single, Dual, Tri, and Quad Models

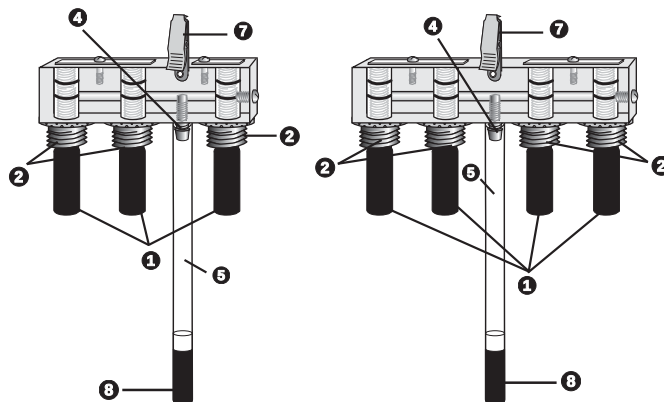
1. Set the pump to low flow mode (*see pump operating instructions, low flow applications*).
2. Attach Tygon tubing ❺ (❽ with rubber tubing end) to the pump inlet.
3. Determine the number of tubes needed for sampling. Break tips off representative tube(s) for pre-sample calibration.
4. Insert a tube into the rubber sleeve of the first port ❶ with the arrow printed on the tube pointing toward the pump. Repeat for desired number of ports. Insert an unopened tube in each unused port to "seal" it.

Top view of Tri
and Quad



Tri
Cat. No. 224-26-03

Quad
Cat. No. 224-26-04



* A smaller interior diameter (ID) rubber sleeve is supplied and attached to the tube holder port. A larger ID rubber sleeve is also supplied and may be used for sorbent tubes with a larger outside diameter (OD). See Note I.

Operation *(continued)*

5. Calibrate the flow rate through each representative tube (*see Notes A, E, F, and G below*).
 - a. Set pump flow rate as directed in the pump operating instructions.
 - b. Connect the tubing from a calibrator to the exposed end of the tube in the first port.
 - c. Using a flat-head screwdriver (*see Note D below*), loosen and open the flow adjust screw (needle valve) ③ on the first port by turning it counterclockwise. Adjust the flow rate by turning the flow adjust screw clockwise to decrease flow and counterclockwise to increase flow until the calibrator indicates the method-specified flow rate (*see Note C below*).

Note: For tri and quad models, first rotate the anti-tamper cover(s) ⑥ to expose the flow adjust screw(s) ③. Reposition anti-tamper covers ⑥ when calibration is completed.

- d. Repeat Steps 5.a and 5.c for remaining active ports (*see Note B below*).

Note: Each port is controlled independently with its own flow adjust screw (needle valve).

- e. Once flow is calibrated for each active port, it is recommended practice to repeat Steps 5.b through 5.d before removing representative tubes.
6. Remove the representative tube(s) used for calibration from the ports and replace with tube(s) to be used for sampling.
7. Thread the appropriate protective tube cover(s) ② on the tube holder.
8. Use the collar clip to attach the holder to the worker's clothing near the breathing zone.
9. Sample for the desired time (*see Note H below*).
10. When sampling is complete, reinstate the representative tube(s) used for calibration in Step 5 and perform a post-sample calibration.

Notes

- A. It is good industrial hygiene practice to perform a pre and post-sample calibration.
- B. Changing the flow rate through any one port will not affect the flow through the other ports. It is recommended practice to perform a second calibration of all active ports under your unique sampling conditions before sampling (*see Steps 5.b through 5.d above*).
- C. **Do not** use the flow adjust screw to shut off flow completely as valve seat damage may result. Use an unopened tube to seal the port.
- D. **Do not** use an oversize screwdriver as thread damage may result.
- E. **Do not** calibrate several tube holders using only one pump. Calibrate each tube holder with the same pump that will be used for sampling. Calibrate before each sampling operation.
- F. When using a multiple port tube holder, set the pump for a flow rate that is $\geq 15\%$ higher than the sum of the flow rates through all connected tubes. *See pump operating instructions for details.*
- G. If the pump enters flow fault 15 to 20 seconds after the adjustable flow tube holder is attached, confirm that the flow adjust screw on the tube holder is open and the pump has been set properly for low flow operation. *See pump operating instructions.*
- H. If you remove one tube from a multiple tube holder during the sampling period, **immediately replace it** with an unopened tube for the remainder of the sampling period.
- I. Two rubber sleeves are supplied for each tube holder port to hold the sorbent tube in place. The smaller ID rubber sleeve comes preassembled and attached to the port. The second larger ID rubber sleeve comes unassembled and may be used for a sorbent tube with a larger OD. To ensure a proper fit, test each sorbent tube and rubber sleeve fit prior to sampling. Using a rubber sleeve with the incorrect ID may result in a loss of flow.

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