Washington State Department of Labor & Industries
Division of Occupational Safety and Health

Sample Procedure:
How to Check Air Flow Rates Provided by Ambient-Air Pumps Used for Asbestos Work

IMPORTANT: This procedure is designed for jobs where employees will use ambient air pumps to supply breathing air to **continuous-flow** respirators during **asbestos** work inside negative-pressure enclosures.

Always follow manufacturer requirements and specifications for operating ambient-air pumps and respirators.

1: Front view of rotameter.

Purpose: To find the "psi" value (operating pressure) needed to ensure the air-flow rate provided to each respirator user meets the 6-cubic foot per meter (CFM) minimum required by WAC 296-62-07715.

Assemble the System Before Testing:

1. **Gather** all equipment and supplies**.** Make sure electrical outlets can provide enough amps to operate ambient air pumps (for example, 15 amps).
   - Make sure you have a properly maintained rotameter (photo **1**), scaled to measure up to 6 CFM. Rotameters marked to measure SCFM instead of CFM are acceptable.
   - Check to make sure only NIOSH-approved respirator hoses, quick connects, and other respirator components will be used. Look for damaged parts and use only NIOSH-approved replacements.
   - Make sure the pressure gauge on each ambient air pump is readable and works.

2. **Determine** how many respirator wearers will use a specific ambient air pump at the same time. For each wearer, determine the maximum number and length of hoses (up to 300-ft. limit) that could be used.
   - Connect all components **exactly as they will be used during work**. For example, if you'll have 3 respirator users drawing air from one ambient air pump, assemble and connect all 3 respirators using the maximum number and length of hoses and couplers.


2: Hose clamp securing one end of the respirator's breathing tube to the facepiece.

3. **Select** the respirator assembly with the longest air-line and most hose connections for testing. Check the respirator's user manual to find and note the minimum and maximum operating pressure values (in "psi" units) specified for that assembly. *Make sure you stay well above the minimum and below the maximum operating pressure psi while following this procedure*.
   - **Disconnect** the breathing tube from the facepiece of the selected assembly by carefully removing the hose clamp (photo **2**) or other fastener. Leave the other end of the breathing tube connected to the air line.
   - When testing multiple-user systems, all other respirator assemblies will need to remain fully assembled and connected to the ambient air pump.
   - Make sure any check valve connected to the breathing tube is in the "closed" position.
   - Attach a barbed-brass fitting (photo **3**) or other adapter to the rotameter.
   - Connect the free end of the respirator's breathing tube to the lower opening of the rotameter (photo **4**).


3: Use a barbed fitting that allows an air-tight connection between the rotameter and the respirator's breathing tube.


4: Keep a screwdriver handy in case you need to secure the end of the breathing tube with an adjustable clamp.

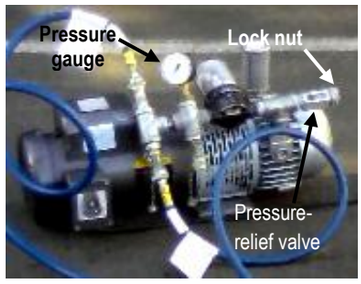
Conduct the test:

4. **Hold or position** the rotameter in an upright position so you can easily read the numbered scale. Locate the pressure-relief valve on the ambient-air pump and loosen the lock nut (using a wrench, if necessary) to make sure the pressure-relief valve is adjustable and open (photo **5**).

5. **Turn on** the ambient-air pump and let the system warm up. While you wait, inspect the system to make sure all connections are air-tight (listen for any hissing sound created by small leaks).

6. **Adjust** the pressure-relief valve until the rotameter reading reaches the 6-CFM mark (or a higher air flow mark, if needed).

   - When you get a 6- CFM reading, note the corresponding "psi" reading shown by the air pump's pressure gauge. **This is the operating pressure (in psi units) needed to achieve the 6 CFM minimum during actual use for the configuration as tested.** You may assume the air flow delivered to the other connected respirator assemblies is the same or higher.
   - If the flow rate remains below 6-CFM (photo **6**) after adjusting up to the maximum psi the pump can safely provide, you'll need to use a different ambient air pump and repeat this procedure; OR, if feasible, make changes to reduce the air-flow demands on the system such as removing one user from the system. Repeat this procedure until you achieve the 6-CFM minimum.



5: Turning the pressure-relief valve adjusts the pump's outlet air pressure (in "psi" units) to increase or decrease the air-flow rate provided to airline respirators. Once adjustments are made to get the right air flow, make sure you retighten the lock nut.

7. **Tag** the pump with the following information (documentation) for easy reference during set up and use of the system later at the job site**:**

   - A description of the system configuration tested including: brand and model of attached respirators; number, length, and diameter of hoses supplying each respirator; and other components of the system).
   - The operating pressure (in psi units) noted during step "6." that corresponds to the respirator configuration being described.
   - The name of the person conducting the test and the test date.

6: A rotameter reading of 5 CFM/SCFM is not acceptable when continuous-flow airline respirators are used for asbestos work.

8. **Tighten** the lock nut on the ambient-air pump while making sure you don't inadvertently adjust the psi setting.

   Notes about additional testing:

   - If you increase the number of users or hoses on the system, switch to a smaller-diameter hose, add quick disconnects, or make other changes that could increase air-supply demands on the system, repeat this procedure to ensure the modified configuration meets the 6-CFM minimum.
   - As a best practice, periodic testing should be used to verify air flow remains at or above 6 CFM and the ambient air pump's pressure gauge continues to function reliably.

9. **Disconnect** the rotameter and reconnect the breathing tube to the test facepiece. Using the system, as configured, at the operating pressure documented in Step 7, should provide the required air flow.