



UNIPHOS PRECISION AIR SAMPLING PUMP

MODEL : ASP - 21



INSTRUCTION MANUAL

Version 2.1 February 2012

INSTRUCTIONS FOR UNIPHOS ASP-21 PRECISION HAND PUMP

The Uniphos precision gas detection system consists of two parts: 1) the detector tube and 2) the gas sampling pump. The sampling pump is used to draw a precise volume of air or other gas through the detector tube to determine the impurity gas or vapor concentration. This manual describes the operation and maintenance of the ASP-21 gas sampling hand pump for use in target gas measurements with detector tubes.

1. HAND PUMP OPERATION

The ASP-21 pump is a piston-and-barrel type pump, as shown in Figure 1. For measurement, a detector tube with both ends open is inserted into the rubber tube connector (rubber inlet) at the end of the barrel. When the piston is withdrawn by pulling the handle, sample gas is drawn slowly through the tube and into the barrel.

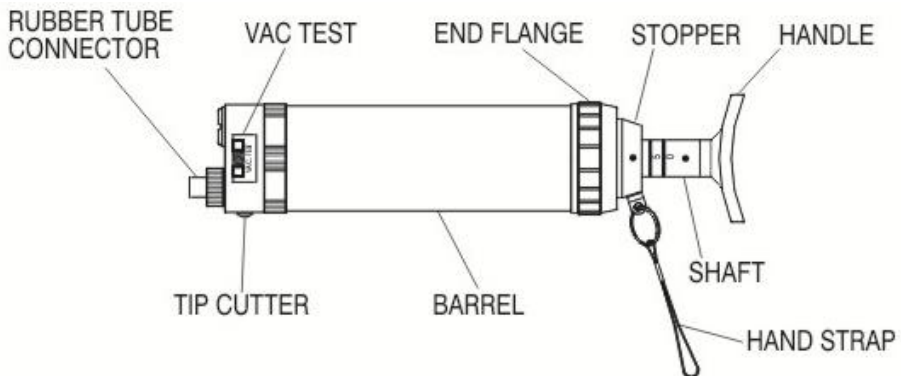


Figure 1. ASP-21 Precision Gas Sampling Hand Pump.

Figure 1 shows the different parts of the gas sampling pump, which are described in more detail in the following sections.

1.1 Tube Tip Cutter

The tube tip cutter is provided on the pump to break off both ends of the detector tube before it is inserted into the pump. To break the tip, insert it into the cutter hole and bend the tube to one side. The broken tips are collected in a storage space (Figure 2), which can be emptied by opening the rubber cap on the opposite side.

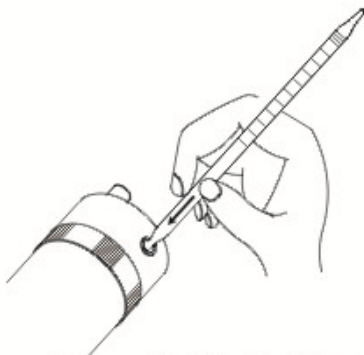


Figure 2. Tube Tip Cutting.

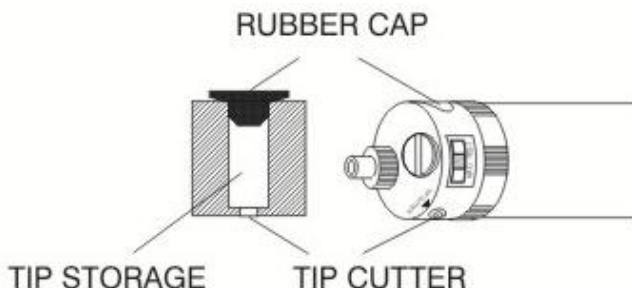


Figure 3. Tube Tip Cutter and Reservoir.

CAUTION:

- Hold the tube close to the end being broken to prevent the tube from breaking in the middle.
- Wear eye and hand protection when breaking open tubes to guard against bits of flying glass and sharp edges.

1.2 Tube Insertion

Insert the open tube into the rubber inlet connector on the pump as shown in Figure 4, ensuring that the arrow on the tube points towards the pump. Hold the tube close to the end being inserted to avoid breakage. Twisting the tube slightly while inserting helps ensure a good seal. In the case of a double tube, first connect the pre-tube with the measurement tube with the ⊗ marks together (Figure 5), and then insert the measurement tube into the hand pump inlet.

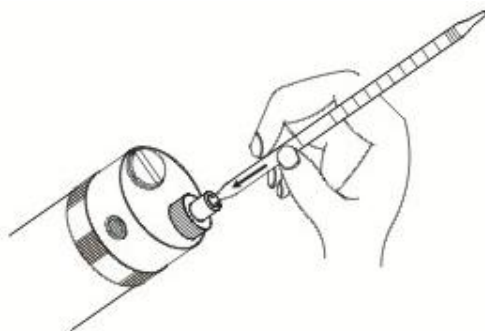


Figure 4. Inserting a Tube

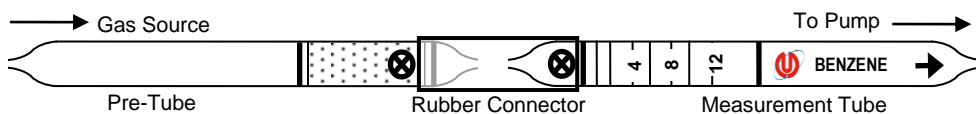


Figure 5. Double Tube Connections

1.3 Volume Selection and Sample Drawing

The ASP-21 pump has markings on the shaft indicating the volume drawn. By aligning the red dots on the stopper assembly and shaft (Figure 6), the pump can be made to latch at either the 50 mL (1/2 stroke) or 100 mL (full stroke) positions. To do this, first look up the proper sample volume on the Tube Sheet or on the tube itself. Align the red dots, insert the tube into the sample gas, pull the shaft slightly past the 50 mL or 100 mL marks until a click is heard, and release the handle (Figure 7). The vacuum in the barrel will draw the piston back to the latching 50 or 100 mL position.

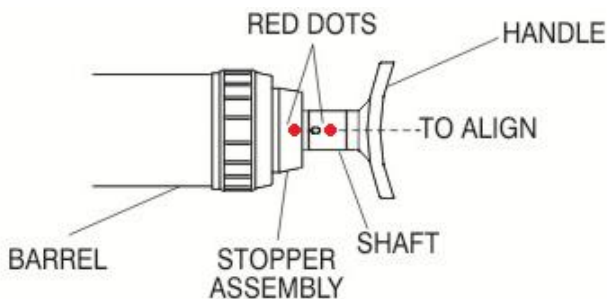


Figure 6. Volume-latching Stopper Assembly.

Keep the end of the tube in the sample gas source while the gas is being drawn through the tube for the allotted sampling time (approximately 1-3 minutes) as indicated on the Tube Sheet. The end of sampling is also indicated by observing the “Vac. Test” indicator as described below.



Figure 7. Drawing a Sample

For larger sample volumes (200 mL or more), rotate the handle by 90°, and push the shaft back into the pump starting position without removing the tube. The pump has an internal check valve that allows the spent gas to escape out the back instead of being forced back through the tube. Then re-align the red dots and draw a second stroke in the same manner as the first. Repeat for additional strokes.

1.4 Vacuum Test (End-of-Flow Indicator)

The Vacuum Test indicator is used to test the pump for leaks as well as to see the completion of gas sampling. When the shaft is drawn and the pump barrel is under vacuum, the red indicator moves to the “Beginning” position shown in Figure 8. When the barrel is full of gas, the red indicator moves to the “End” position, indicating that flow through the tube is done.

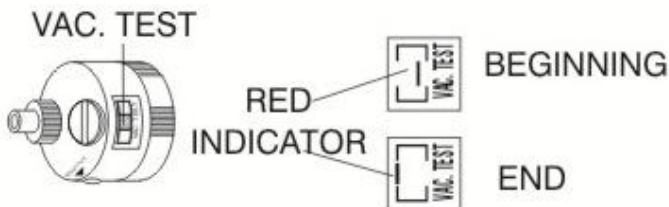


Figure 8. Vacuum Test Indicator.

2. HAND PUMP LEAK CHECK

Before each day's use, the hand pump should be checked for leaks as follows:

- Insert a new, *unopened* tube into the inlet tube connector.
- Align the red dots and pull the pump handle one full stroke.
- Wait 3 minutes and release the pump handle by rotating it 90° left or right and allow the piston to come back while holding the handle.
CAUTION: keep a little resistance on the handle to prevent the piston from snapping back suddenly and possibly damaging the pump.
- If the piston returns completely (within 1-2 mm) of its original position, it is free of leaks and ready for use. If it does not, the pump has leaks. Troubleshoot as described in the next section under Maintenance.

We recommend that a leak check also be performed when switching to tubes for a different test chemical. Because different types of tubes are designed with slightly varying diameters, a leak check performed on one kind of tube may not give the same result as another kind tube.

3. HAND PUMP MAINTENANCE

The ASP-21 hand pump needs occasional maintenance.

3.1 Greasing the Barrel and Replacing the Plunger Gasket

If the pump leaks, or the piston action is too stiff or loose, it may require internal re-greasing and/or replacement of the plunger gasket:

- Unscrew the end flange and pull out the piston as in Figure 8.

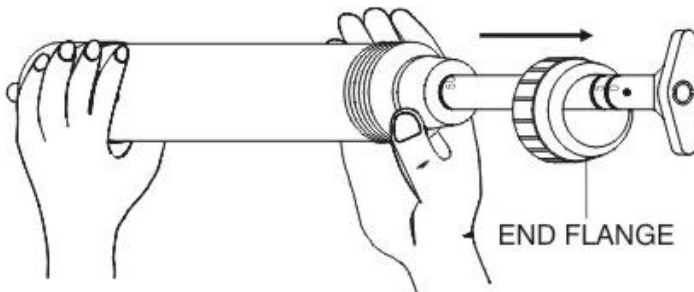


Figure 8. Removing the Piston.

- Wipe off the piston and the inside surface of the barrel.
- Inspect the piston gasket on the end of the plunger for damage and replace as necessary. To replace the gasket, use a small screwdriver

or other sharp object to lift off the worn gasket, and slip a new gasket into the groove.

- Apply fresh grease to the piston gasket and the inside of the barrel.
- Push the piston back into the barrel and tighten the flange.

3.2 Replacing the Inlet Rubber Tube Connector

If the rubber tube connector is worn, it may cause leaks. Unscrew the connector holder and replace the connector.

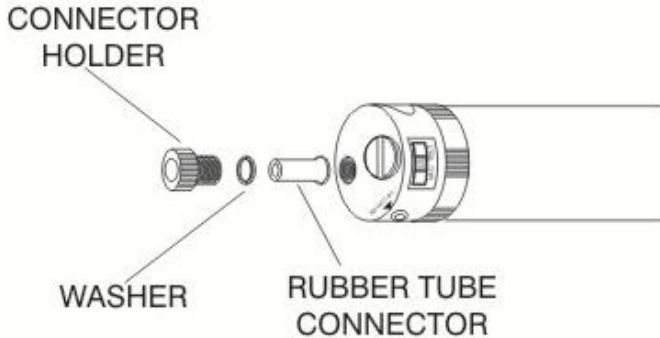


Figure 9. Inlet Rubber Tube Connector Assembly.

3.3 Pump Troubleshooting Summary

In case of a leaking pump, the following should be checked for possible replacement or correction.

Symptom/Cause	Corrective Action
<ul style="list-style-type: none"> • Rubber tube connector is loose. • Pump Leaks. Rubber tube connector is worn or damaged. • Pump Leaks. Piston sticks or slips too easily. • Pump leaks because internal check valve leaks. 	<ul style="list-style-type: none"> • Tighten connector holder. • Replace the inlet tube connector. • Clean and re-grease the inside of the barrel and/or replace piston gasket. • Replace Pump



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