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# Detection Tube and LP-1200 Pump Operation & Maintenance Instructions

**CAUTION:**

- **Wear safety glasses and gloves when opening tubes or handling open tubes with sharp edges.**
- **Always test the pump for leaks before use to ensure proper sample measurement.**
- **Dispose of spent tubes according to local regulations. Potentially hazardous materials are given under the section "Reaction Principle" supplied with each type of tube.**


## TUBE MEASUREMENTS

Testing Hand Pump for Leaks:

Insert an unopened tube snugly into the inlet of the aspirating pump. Pull the plunger one full stroke and wait 2 minutes. Rotate the plunger dot away from the pump-shaft alignment mark, and allow the plunger to be drawn back into the pump shaft. Keep your hand on the shaft to keep it from springing back too suddenly. There are no leaks if the plunger returns to within 3 mm of its original position.

Measurement Procedure:

1. Break both ends of a new detection tube using the tip breaker on the side of the pump. Insert the tube until it stops and then back off about 1 mm before breaking. The latter procedure allows the tip to fall into the tip reservoir at the end of the pump shaft.
2. Insert the tube securely into the rubber pump inlet with the tube arrow pointing towards the pump.
3. Select the sample volume desired and align the red dot on the plunger with the red line on the pump shaft. Pull the handle quickly until it latches at ½ or 1 full stroke (50 or 100 mL) and wait for the indicated sampling time to allow the air to be drawn through the tube. Flow is complete when the end-of-flow indicator returns to its full brightness.
4. For additional pump strokes, rotate the handle ¼ turn left or right and push it back fully without removing the tube from the pump. Then repeat Step 3.

Reading Tubes:

1. Read the concentration directly from the scale printed on the tube. If a non-standard number of pump strokes was used for sampling, multiply the reading by the correction factor given on the tube data sheet.
2. Read the tube immediately after air sampling, as colors may change, fade, or disperse with time.
3. The reading is taken as the furthest distance along the tube that the color change just becomes visible. If the leading edge is diagonal instead of perpendicular to the axis of the tube, use the average value.
4. Check the data sheet supplied with each box of tubes and apply any CFs (Correction Factors) for temperature or humidity. Multiply the observed reading by the CF to obtain the true value.

## PUMP MAINTENANCE (MODEL LP-1200)


Tube Tip Reservoir

Remove the tube tip reservoir cover as needed to empty the broken glass reservoir that is in the pump end fitting.

Pump Inlet and Filter

The rubber pump inlet can become worn with use and result in leaks. Unscrew the pump inlet nut and replace the rubber inlet. If the inlet is not replaced, inspect the inlet filter and replace or clean as necessary.

Pump Mechanism

1. The plunger gasket may leak if worn or not well lubricated. To replace the gasket, unscrew the pump end fitting on the handle side and pull the plunger out of the pump shaft. After replacing the gasket, carefully push the plunger back into the shaft; use a fine screwdriver or tweezers to help ease the gasket into the shaft. Lubricate the inside of the shaft with vacuum grease to ensure a good seal. Caution: Do not over tighten the plunger gasket. It could cause a sudden loss of vacuum.
2. The inlet check valve may cause leaks if worn or not lubricated. Unscrew the end fitting on the inlet side and pull out the disk-shaped rubber-inlet check valve. Replace as necessary adding a light coat of grease around the hole.
3. Replace the outlet check valve gasket if there is resistance on the return stroke. Using the special tool or needle-nose pliers, unscrew the plunger tip from the plunger rod. Replace the O-ring, check valve gasket as necessary, and reassemble.
4. Inspect the gasket ring in the inlet end fitting and replace if damaged before screwing the end fitting back on.