

## Instructions for the use of Ketones with the Liberty ICP-OES System

For analyses using ketone organic solutions (for example, MIBK, DIBK), different types of sample and drain tubing are required as follows:

- Kit of 12 Ketone resistant pump tubes for sample, part number 9910061000
- Kit of 12 Ketone resistant pump tubes for drain, part number 9910060900
- Ketone resistant tubing 0.8 mm (0.03 in.) ID for sample, part number 3710035900\*
- Ketone resistant tubing 1.6 mm (0.06 in.) ID for drain, part number 3710035700\*

\* Order by the meter

Connection details are as follows:

### Pump Tubes

Pump tubes are made up of a length of ketone solvent resistant pump tubing fitted with a barbed nipple and retaining sleeve at each end. The pump tube kits contain 12 lengths of pump tubing (131 mm LG) together with 4 sleeves and 8 nipples. This allows the initial assembly of 2 tubes, 1 for use and 1 spare, with 4 spare nipples in case of breakage.

#### NOTE

SAMPLE tubes are 0.8 mm (0.03 in.) ID, and use GREY sleeves with 1.6 mm (1/16 in.) barbed nipples.

DRAIN tubes are 1.6 mm (0.06 in.) ID, and use WHITE sleeves with 2.4 mm (3/32 in.) barbed nipples.

The sample tube kit contains an additional large nipple and short length of 3.2 mm (0.126 in.) ID tube for connection to the nebulizer.

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#### To assemble a pump tube:

- 1 Slip the sleeve onto the tubing and fully insert one end of the nipple into the tubing.
- 2 Hold the body of the nipple, stretch the tubing slightly (by gently pulling it away from the barb), and push the sleeve back over the barb to clamp the tubing onto the nipple as shown in Figure 1. Repeat this for the other end.
- 3 Take another length of tubing and assemble as described above, to provide a spare tube ready for replacement.



Once a tube has failed, remove the nipples and sleeves and reassemble with a new length of tubing.

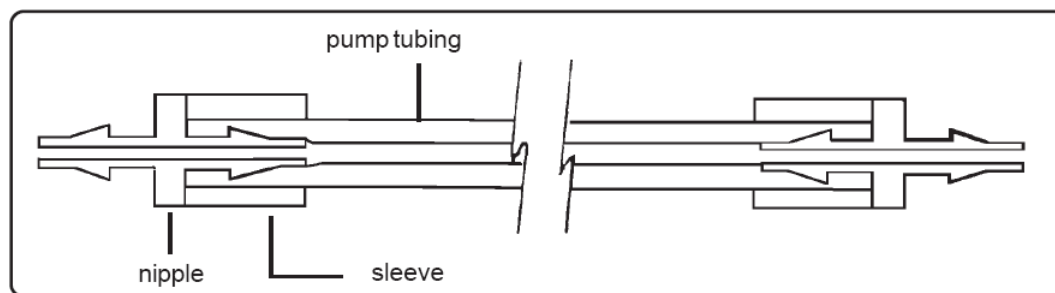


Figure 1. Pump tube assembly detail

## Sample Tube Connections

### To set up the sample line plumbing:

- 1 Pump tube: Assemble sample pump tubes as detailed in 'Pump Tubes'.
- 2 Sample input line: Take a small length (approximately 20 mm (0.8 in.)) of 0.8 mm (0.03 in.) ID ketone resistant tubing and fit it to the barb on the inlet end of the pump tube. The regular sample uptake capillary supplied with the Liberty can now be fitted into the 0.8 mm (0.03 in.) ID tubing.
- 3 Nebulizer connection:

**Glass Concentric:** Fit the short piece of 3.2 mm (0.13 in.) ID tubing, and large nipple supplied with the sample pump tube kit, onto the inlet of the nebulizer as shown in Figure 2. The nipple on the nebulizer can now be connected to the nipple on the outlet of the sample pump tube by using a 260 mm (10.2 in.) length of 0.8 mm (0.03 in.) ID ketone resistant tubing. Alternatively, two small pieces of this tubing on each nipple, together with a connecting piece of sample capillary can be used.

### NOTE

Before connecting the tubing to the nebulizer, it is recommended to flush the sample line (by running the peristaltic pump with the solvent to be used) to clear the tubing of any particulate matter that may block the nebulizer.

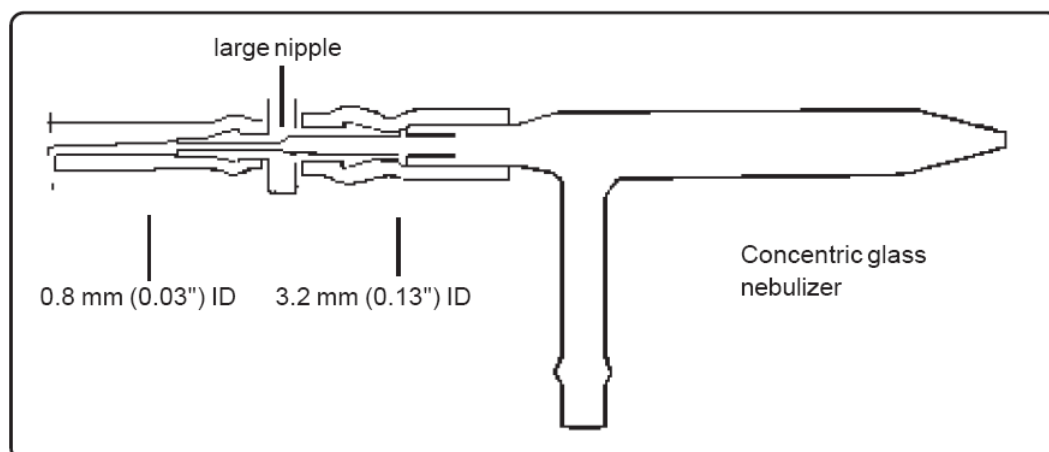


Figure 2. Nebulizer connection

**Optional 'V' Groove:** The PTFE inlet capillary of this nebulizer can be attached to the pump tube outlet by using a short length (approximately 50 mm (2 in.)) of 0.8 mm (0.03 in.) ID tubing.

## Drain Tube Connections

**To set up the drain line plumbing:**

- 1 Pump tube: Assemble drain pump tubes as detailed in 'Pump Tubes'.
- 2 Spray chamber to pump: Connect a length (approximately 350 mm (13.8 in.)) of 1.6 mm (0.06 in.) ID tubing from the nipple on the bottom of the spray chamber, to the inlet nipple on the drain pump tube.
- 3 Pump to waste: Connect a length of 1.6 mm (0.06 in.) ID tubing from the outlet nipple on the drain pump tube, to a suitable waste vessel.

### **WARNING**



#### **Fire, Explosion and Noxious Gas Hazard**

**Ketones are noxious and flammable. To prevent death or injury from fire, explosion or vapors, always ensure that the working area is well ventilated, sufficient separation is maintained from any source of ignition, the quantity of liquid is minimized, and a wide mouthed plastic drain vessel (suitable for ketones) is used.**

This information is subject to change without notice.



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