

★READ CAREFULLY THIS INSTRUCTION MANUAL AND THE INSTRUCTION MANUAL OF THE SAMPLER PRIOR TO USING THIS PRODUCT.

★DO NOT DISCARD THIS INSTRUCTION MANUAL UNTIL ALL THE TUBES IN THIS BOX ARE USED UP.

### 1. PREFACE

Silica-gel tube is used to analyze organic solvent vapours in ambient air. Particularly, it is effective for analyzing and collecting polar solvent vapour, i.e. methanol, acetone which can not be satisfactorily collected by charcoal tube. Organic solvent vapours are absorbed and collected on Silica-gel section in passing through the tube. The desorption of the organic solvent vapours are made by the solvent, and the organic solvent are analyzed by gas chromatograph.

Conventional Silica-gel tube usually consists of two sections. 2nd section's Silica-gel (backup layer) is analyzed for confirmation of breakthrough. If the breakthrough is confirmed, a correct measurement result is not provided. The silica-gel tube 801 contains Silica-gel section and Breakthrough indicator that packed separately in to the glass tube. When sample air corresponding to 60 to 80% of the amount causing breakthrough is passed, the colour of Breakthrough indicator begins to change from blue to pink by the moisture from the Silica-gel side of indicator. Moreover, absorbed organic solvent in 1st section (absorption layer) will be transmitted to the 2nd section for equilibrium in conventional Silica-gel tube. Analysis becomes difficult so that these phenomena are seen.

However, there is no such a problem in 801 and it can keep for a long term because Silica-gel 801 has only one Silica-gel section. (no backup layer)

#### CAUTION

1. SAFETY GLASSES AND GLOVES SHOULD BE WORN TO PREVENT INJURY FROM SPLINTERING GLASS.
2. DO NOT TOUCH SILICA-GEL OR INDICATOR DIRECTLY ONCE TUBES WERE BROKEN. IN CASE OF CONTACT WITH THE CONTENTS OF BROKEN TUBES, WASH OFF SKIN THOROUGHLY WITH WATER.
3. KEEP THE TUBES OUT OF THE REACH OF CHILDREN.

#### NOTICE

1. STORE TUBES IN A COOL AND DARK PLACE (0-25 °C/32-77°F).
2. USE THE TUBE IMMEDIATELY AFTER CUTTING ENDS OF A TUBE.
3. PRIOR TO USE, READ CAREFULLY ITEM 6. USER RESPONSIBILITY.

### 2. SPECIFICATION

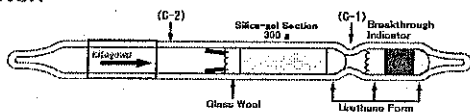


Fig.1

**SPECIAL NOTE:** Cut the tube at the point C-1 and C-2 \* (Fig.1) to take off the Silica-gel and Breakthrough indicator after sampling. Safety glass and gloves should be worn to prevent injury from splintering glass.

\* Avoid the point of the label when cutting the tube

### 3. SAMPLING

- ① Break both ends of a new silica-gel tube with attached ampoule cutter.
- ② Connect the tube end to the continuous drawing pump which has stable sampling flow rate, 50-200 mL / min with connecting tube as shown in Fig. 2. (Arrow mark shall point to the pump.)
- ③ The sampling volume is obtained by the following equation;  
Sampling Volume (L) = Flow Rate ( mL / min ) × Time ( min ) / 1000
- ④ Hold the tube vertically for sampling. In the event the tube takes horizontal position, an air gap in the upper part of the Silica-gel may occur and the samples pass there sometimes. Consequently, it will cause breakthrough.
- ⑤ After sampling, break off the tube at the point of (C-1) on Fig.1 and take off the Breakthrough indicator from the Silica-gel section. Then, connect accessory caps with both ends of the Silica-gel section and preserve it in a cool and dark place.

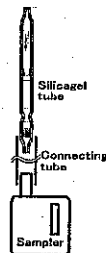


Fig.2

### 4. RECOVERY AND ANALYSIS

- ① Dissolve the standard sample (which means known concentration sample) into desorption solvent. This is standard solution.

(Example) Making standard solution

Dissolve 1 mL of Methanol (Specific gravity = 0.7928) into pure water. The total amount of pure water is 100 mL. The concentration of this standard solution is as follows:  
0.7928 g / 100 mL = 7928 μ g / mL

- ② Dilute the standard solution step by step and make the working curve by means of injecting the diluted standard solution at each step into gas chromatograph.
- ③ Cut the silica-gel tube at the point C2, (Fig.1) Take off the he lock spring and Glass-wool plug on the silica gel section. Remove the silica gel and put into a sample vial completely.
- ④ Pour 2-3 mL of desorption solvent such as pure water into the sample vials, put on the lid, shake them for 1 min and leave them for approx. 1 - 2 hours. While the leaving time, shake them several times.
- ⑤ After the leaving, inject the extracted solvent 1 - 5 μ L into a gas chromatograph and determine the concentration of the sample by using the following equation with the working curve:

Calculation :

$$R.A. = R \times \frac{V_{is}}{V_t} \times V_t$$

R.A. : Recovery amount ( μ g )  
R : Reading from the working curve ( μ g / mL )  
V<sub>is</sub> : Injection volume of standard solvent ( μ L )  
V<sub>t</sub> : Injection volume of desorption solvent ( μ L )  
V<sub>t</sub> : Total volume of desorption solvent ( mL )

$$C_t = \frac{R.A.}{D.E.} \times \frac{1}{M} \times \frac{1}{S.V.} \times \frac{22.4 \times (273 + t)}{273} \times 100$$

C<sub>t</sub> : Concentration of the sample ( ppm )  
R.A. : Recovery amount ( μ g )  
D.E. : Desorption efficiency ( % )  
M : Molecular weight  
S.V. : Sampling volume ( L )  
t : Temperature of sampling environment ( °C )

※ The desorption efficiency are different each other by kinds of sampled organic solvent and desorption solvent. The desorption efficiency differ by used equipment and analytical operation. It should be obtained by each analyst. Further, the desorption efficiencies are measured by means of comparison with direct collection method or by means of comparison with recovery amount of Silica-gel which is adsorbed a certain volume of the standard sample.

### 5. DISPOSAL OF TUBES:

**USED TUBES SHOULD BE DISPOSED CAREFULLY ACCORDING TO RELEVANT REGULATIONS, IF ANY.**

### 6. USER RESPONSIBILITY:

It is the sole responsibility of the user of this equipment to ensure that the equipment is operated, maintained, and repaired in strict accordance with these instructions and the instructions provided with each sampler.

The Manufacturer and Manufacturer's Distributors shall not be otherwise liable for any incorrect measurement or any damages, whether damages result from negligence or otherwise.

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