

# Carbon Beads Active Tube, Monolayer Type

## OPERATION MANUAL

Thank you for purchasing this product.

- This operation manual describes important precautions for preventing accidents as well as procedures for handling the product.
- To ensure safety, read this operation manual thoroughly before use and use the product correctly.
- After reading this operation manual, keep it handy for future reference.

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## Before Use

Before use, please read through this operation manual carefully. In particular, be sure to read the "Safety Precautions," which describe important information for ensuring the safe use of the product, and for preventing harm to you and other people, and damage to property.

## Included Items

Check the contents of the package before using the product.

<ul style="list-style-type: none"> <li>• Carbon beads active tube... Set of 24</li> <li>• Vinyl tube ..... 1</li> <li>• Heart-shaped cutter ..... 1</li> <li>• Operation manual (this manual) ... 1 copy</li> </ul>
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- \* If any of the items are damaged or missing, contact your Sibata representative or the vendor where you purchased the product.
- \* This product does not include a sorbent tube holder, suction pump, or connecting silicon tube, so prepare them separately.

## Product Shelf Life

The product shelf life is 3 years after manufacture. For the month and year of manufacture, refer to the lot No. indicated on the box.

**Example**

Last digit of the calendar year ——— Indicates the month (October to December are written as "X" to "Z.")

LOT. No. 77 \* \*

- In this example, the number indicates that it was manufactured in July 2017.

## Inquiries

- ? If you have any questions about this product, or if there is any other way in which we can be of assistance, contact your Sibata representative or the vendor where you purchased the product.

## Safety Precautions

The precautionary information in this operation manual is provided to ensure the safe use of the product and to prevent property damage and injury to you and other people. It is all important for ensuring safety, so be sure to read it thoroughly before using the product and observe it during use.

## Symbols

Various symbols are used in this operation manual to indicate warnings and instructions. The meanings of the symbols are as follows. Fully understand the following descriptions before reading the subsequent sections.

	<b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or possibly death.
	<b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor to moderate injury or equipment damage.
<b>Examples of Symbols</b>		
	<b>Do Not Touch</b>	The  symbol indicates prohibited actions (that must not be done). Specific details are given in or near the symbol. The label on the left indicates that touching is prohibited.
	<b>Mandatory</b>	The  symbol indicates a mandatory action (that must be done). Specific details are given in or near the symbol. The label on the left indicates instructions that must be followed.

## Precautionary Information

<p> <b>WARNING</b></p> <p>The analysis should be performed by someone with skills and expertise in the field of chemistry.</p> <p> <b>Mandatory</b></p> <p>Inexperienced operators should always perform analysis work under the supervision of an experienced operator or outsource the process to an analysis and measurement service provider qualified to do so.</p>	<p> <b>WARNING</b></p> <p>Do not use this product for other purposes or applications.</p> <p> <b>Prohibited</b></p> <p>Safety cannot be ensured if the product is used for anything other than noted in this operation manual.</p>	<p> <b>WARNING</b></p> <p>Do not leave the product within reach of children.</p> <p> <b>Do Not Touch</b></p> <p>Otherwise there is a risk of accidents such as children putting the product in their mouths.</p>
<p> <b>CAUTION</b></p> <p>Use a sorbent tube holder for individual exposure measurements.</p> <p> <b>Mandatory</b></p> <p>Failure to do so may result in injuries.</p>	<p> <b>CAUTION</b></p> <p>Never touch glass cut surfaces or fragments.</p> <p> <b>Do Not Touch</b></p> <p>Failure to do so may result in injuries.</p>	<p> <b>CAUTION</b></p> <p>Dispose of this product appropriately after use.</p> <p> <b>Mandatory</b></p> <p>After use, be sure to dispose of it appropriately as specified by your local government.</p>

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info@sedulitas.co.za +27 (0)82 551 4001  
www.sedulitas.co.za

SIBATA SCIENTIFIC TECHNOLOGY LTD.

# SIBATA

1-1-62, Nakane, Soka, Saitama, 340-0005, Japan  
TEL: +81-48-933-1582 FAX: +81-48-933-1591  
E-mail: overseas@sibata.co.jp  
<http://www.sibata.co.jp/english/>

## ■ About This Product

This product consists of a glass tube filled with cleaned carbon beads (activated carbon beads) collected in a single layer, and sealed. This is a monolayer type, so the suction stability is excellent, and it is suitable for applications in which backup activated carbon is not required.

The glass tube has been subjected to precutting processing to make it easy to snap.

## ● Main Specifications

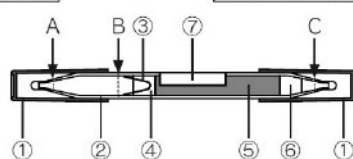
Adsorbent	Activated carbon beads (mesh of 20 to 40) 200 mg
Size	About O.D. 6 × 70 mm
Weight	About 2.0 g (per tube)
Tubes Included	Set of 24
Item Code	080150-094

★ Purchase a sorbent tube holder, type A (item code: 080150-055), which is optional and optimal for this product.

## ■ Names of Parts

### ● Carbon beads active tube

▶ Air Intake ◀ Out (to suction pump) ▶



- (1) PE caps (2) Glass tube  
(3) Spring stopper (4) Quartz wool  
(5) Activated carbon beads  
(6) Urethane foam (7) Label

★ Positions A, B, and C have been subjected to precutting processing.

### ● Other

#### Heart-shaped cutter



★ The heart-shaped cutter is used to further deepen the pre-cut grooves.

## ■ After Measurement

● After use, separately dispose of each material in the carbon beads active tube, as specified by your local government.

Part Name	Material
Carbon beads active tube	Glass
Activated carbon beads	Charcoal
Quartz wool	Glass
Spring stopper	Stainless steel
Urethane foam	Urethane
PE cap	Polyethylene
Heart-shaped cutter	Abrasive sand
Vinyl tube	Vinyl chloride
Labels and packing materials	Paper

● Store the carbon beads active tube in a cool, dark, dry location.

## ■ Desorption Rate

Obtain the desorption rate in accordance with the intended measurement method.

### Example

#### Working environment measurements

▶ It is obtained by the standard gas method or the phase equilibration method.

#### Indoor environment measurements

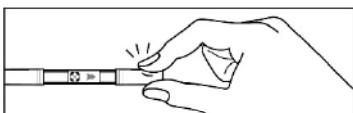
▶ It is obtained by the standard gas method or the solvent vaporization adsorbent method.

## ■ Instructions for Use

Before use, be sure to thoroughly read the "Safety Precautions."

### ● Sampling Procedure

- (1) Immediately before sampling, snap off the PE caps at both ends of the carbon beads active tube from above, as shown in the figure below.



- (2) Remove the PE caps, and connect the carbon beads active tube and suction pump using a silicon tube. For individual exposure measurements, be sure to use a sorbent tube holder, purchased separately, to ensure that the cut surface of the glass is not touched during the measurement.

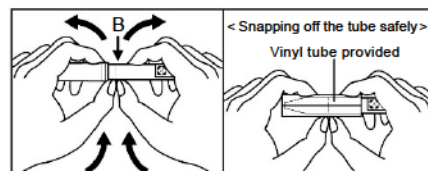
★ Do not throw away the PE caps, as they are used after sampling.

- (3) Set up the suction pump to suit the purpose of the measurements. Start the suction, and at the same time sampling starts.

- (4) When sampling is finished, remove the silicone tube (sorbent tube holder) from the carbon beads active tube. Re-attach the previously removed PE caps to both ends of the carbon beads active tube. After sampling, store the carbon beads active tube in a clean, cool, dark location until analysis is performed.

### ● Analysis Procedure (Typical Example)

- (1) Immediately before analysis, snap off the carbon beads active tube by putting your fingernails at the pre-cut groove (B), and then pulling both sides apart (as shown in the figure below). After the tube is snapped, use tweezers to take out the spring stopper and quartz wool from inside. Place 200 mg of the activated carbon beads in a dark brown test tube with a stopper, or in a dark brown vial bottle (with a rubber septum), and seal it.



- (2) Using a volumetric pipette, add 2 mL of desorption solvent (such as carbon bisulfide) to the respective dark brown test tube. Recap the tube, and shake it gently. Leave it for approximately 2 hours for extraction. Shake it several times while it is left standing.

★ Shaking the tube is easier if you use a charcoal vibrator (sold separately).

- (3) After extraction is finished, collect 1.0 μL of the solution using a micro syringe, and inject it into a gas chromatograph. Measure the peak area (or peak height (same below)) of the separated target substance. Using the calibration curve obtained by the gas chromatograph, determine the absolute quantity ( $M_1$ : g) of the injected target substance.

#### (4) Calculating the concentration in air

The total quantity of the extract is 2 mL, so if the total quantity of the target substance contained in the activated carbon beads is  $M_s$  (g), then

$$M_s = \frac{2.0 \times 10^{-3} \text{ (L)}}{1.0 \times 10^{-6} \text{ (L)}} \times M_1 \text{ (g)} = 2.0 \times 10^3 M_1 \text{ (g)}$$

Furthermore,  $M_a$  will be the value with the desorption rate (D: %) applied.

$$M_a = M_s \div (D \div 100)$$

If  $M_a$  is converted to the volume at the measurement temperature, the volume is  $V_s$  (L), the measurement temperature is 25 °C, the pressure is 101 kPa, and the molecular weight of the target substance is  $W$  (g), then

$$V_s = M_a \times \frac{22.4}{W} \times \frac{273 + 25}{273} = \frac{24.46}{W} \times M_a$$

Accordingly, if the quantity of sample gas collected is  $V_o$  (L), the concentration  $C$  (ppm) of the target substance in the sample gas will be obtained from the following formula.

$$C = \frac{V_s \text{ (L)}}{V_o \text{ (L)}} \times 10^6$$