

- ★ READ THIS INSTRUCTION MANUAL AND THE INSTRUCTIONS OF THE AIR FLOW INDICATOR (AS-1, AS-2) OR THE EXTENSION AIR FLOW INDICATOR (AS-3) PRIOR TO USE OF THIS PRODUCT.
- ★ DO NOT DISCARD CAREFULLY THIS INSTRUCTION MANUAL UNTIL ALL THE TUBES IN THIS BOX ARE USED UP.

## 1. PREFACE

Available for checking air flow near ventilation hood, the indoor air flow, etc. Air flow Indicator (Aerosol ejector) Model AS-1 is used for spot or intermittent checking and Model AS-2 for continuous one. Model AS-3 is used for intermittent or continuous operation. These Air Flow Indicators develop smoke without combustion.

### ⚠ CAUTION

1. THE AIR FLOW INDICATOR TUBE CONTAINS CORROSIVE REAGENTS. (TIN TETRACHLORIDE.)
2. DO NOT TOUCH THESE REAGENTS DIRECTLY ONCE TUBES WERE BROKEN.
3. KEEP THE TUBES OUT OF THE REACH OF CHILDREN.

### NOTICE

1. USE ONLY WITH AIR FLOW INDICATOR (AS-1, AS-2) OR EXTENSION AIR FLOW INDICATOR. (AS-3)
2. STORE TUBES IN A COOL AND DARK PLACE (0-25 °C/32-77°F).
3. PRIOR TO USE, READ **ITEM 8. USER RESPONSIBILITY** CAREFULLY.
4. THE COLOUR OF SMOKE IS BECOME LIGHT AT THE PLACE THAT IS LOW HUMIDITY CONDITION.
5. TUBE MIGHT NOT GENERATE SMOKE AFTER CUT THE BOTH ENDS OF THE TUBE AND A LONG TERM PRESERVATION WITH ATTACHED CAPS OF THE ACCESSORIES.
6. OPERATING HUMIDITY IS MORE THAN 0.2mg / L.

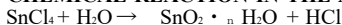
## 2. SPECIFICATION

**SIDE A**  
(BULB OR TUBE SIDE)



Fig.1

## 3. CHEMICAL REACTION IN THE AIR FLOW INDICATOR TUBE:



The smoke is generated by the reaction of the reagent (Tin tetrachloride) with the moisture contained in the passing through the tube.

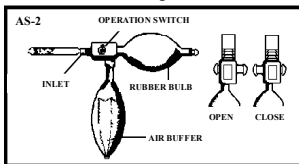
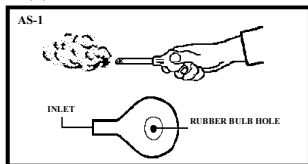
## 4. OPERATION

1. Break both ends of the air flow indicator tube with attached ampoule cutter, and insert the end of the tube of the SIDE A into the inlet of the Air Flow Indicator, Model AS-1, AS-2 or AS-3.

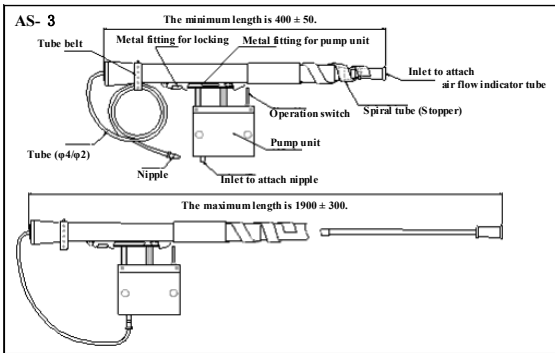
### ⚠ CAUTION

**SAFETY GLASSES AND GLOVES SHOULD BE WORN TO PREVENT INJURY FROM SPLINTERING GLASS.**

2. Squeeze the rubber bulb and a white aerosol comes out.
  - (1)AS-1: Put the thumb on the rubber bulb hole and squeeze it.



- (2)AS-2: Close the operation switch and squeeze the rubber bulb repeatedly. After the air-buffer was swollen, open the switch to blow out white aerosol continuously. 10 times of squeeze of the rubber bulb gives white aerosol for about 1 minute.



(3)AS-3: Turn the operation switch to the intermittence or continuance position.

3. In case of stopping smoke, remove the tube off and cap the both ends tightly with caps of accessories. Air Flow Indicator tube can be used repeatedly.

※ See descriptions of the instructions of the AS-1, AS-2 and AS-3.

#### 5. MEASUREMENT OF AIR FLOW RATE:

An air blow rate  $V$  (m / sec.) is obtained with a flowing distance of white aerosol  $L$  (m) divided by a time period (sec.) as shown in the following equation.

$$\text{Flow rate } V \text{ (m / sec.)} = L / t$$

#### 6. CALCULATION OF VENTILATION VOLUME

A ventilation volume  $Q$  (m<sup>3</sup> / sec.) is calculated with a cross section of a ventilation hood  $A$  (m<sup>2</sup>) multiplied by a flow rate  $V$  (m / sec.) as shown in the following equation.

$$\text{Ventilation volume } Q \text{ (m}^3 \text{ / sec.)} = A \times V$$

**⚠ CAUTION**

**GENERATED SMOKE FROM THE AIR FLOW INDICATOR CONTAINS HYDROGEN CHLORIDE WHICH IS TOXIC. PAY ATTENTION TO THE FOLLOWING.**

1. Do not breathe the smoke. The smoke may irritate the eyes, nose, throat, etc. When the smoke touched on the skin, wash it out with water. When you breathed it, gargle well.
2. The smoke corrodes metals. Do not use it near the precision instrument, etc.
3. Do not use it in confined room, hospital or clean room. When used by some reasons, ventilate there well after the use.
4. Take care that the tube is not to be broken. When broken, wear safety glove and put them in a like plastic bucket filled with water, then throw it away; Do not touch by the hand directly.
5. A thing such as a white film may exist in the Air Flow Indicator tube, but it does not affect usage.

**⚠ CAUTION**

**AFTER USE OF AIR FLOW INDICATOR, STORE IT AFTER REMOVING THE AIR FLOW INDICATOR TUBE FROM THE AIR FLOW INDICATOR (AS-1, AS-2, AS-3). IF SMOKE IS LEFT IN RUBBER BULB (AS-1, AS-2) OR TUBEING (AS-3), IT MAY CAUSE TROUBLE.**

#### 7. DISPOSAL OF TUBES:

USED AIR FLOW INDICATOR TUBE THAT STILL GENERATE THE SMOKE SHOULD BE PUT IN A LIKE PLASTIC BUCKET FILLED WITH WATER BEFORE DISPOSAL OF TUBES. (TAKE OFF THE CAPS FROM THE TUBES) WATER IN BUCKET BECOME ACID TO PUT IN THE AIR FLOW INDICATOR TUBE. BEFORE DISPOSAL OF THE WATER, PUT IN THE SODIUM CARBOXYL HYDRIDE INTO THE WATER FOR NEUTRALIZATION. WHEN THAT TIME, CARBON DIOXIDE OF HIGH CONCENTRATION WILL BE GENERATE FROM THE WATER, SO THIS NEUTRALIZATION SHOULD BE OPERATE AT THE PLACE THAT IS VENTILATED WELL. USED TUBES AND WATER SHOULD BE DISPOSED CAREFULLY ACCORDING TO RELEVANT REGULATIONS, IF ANY.

#### 8. 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 Model AS-1, AS-2 or AS-3.

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.

※ Product specifications are subject to change without any prior notice.