

- ★ READ CAREFULLY THIS INSTRUCTION MANUAL AND THE INSTRUCTIONS OF THE ASPIRATING PUMP PRIOR TO USING THIS PRODUCT.
- ★ DO NOT DISCARD THIS INSTRUCTION MANUAL UNTIL ALL THE TUBES IN THIS BOX ARE USED UP.
- ★ 174B CAN MEASURE HIGH TEMPERATURE GAS SUCH AS EXHAUST GAS FROM COMBUSTION APPARATUS WITH ATTACHED HOLLOW GLASS TUBE.

|                        |   |                               |
|------------------------|---|-------------------------------|
| <b>1. PERFORMANCE:</b> | NO  | NO <sub>2</sub>               |
| Measuring Range        | : 10 - 300 ppm  | 1 - 40 ppm                    |
| and Pump Stroke        | : 1 pump stroke   | 1 pump stroke                 |
| Sampling Time          | : 1.5 minutes   | 1.5 minutes                   |
| Colour Change          | : White → Yellowish orange                                      | White → Pale yellowish orange |
| Detectable Limit       | : 1 ppm   | 0.5 ppm                       |
| Operating Temperature  | : 10 - 30 °C (50 - 86°F) (Temperature correction is necessary.) |                               |
| Aspirating Pump        | : Model AP-20, AP-20S, 400B, AP-1, AP-1S or 400A                |                               |

**⚠ CAUTION**

**1. THE DETECTOR TUBE CONTAINS CHEMICAL REAGENTS.**  
**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 PUMP MODELS AP-20, AP-20S, 400B, AP-1, AP-1S OR 400A. OTHERWISE, CONSIDERABLE ERROR IN INDICATION MAY OCCUR.
2. BEFORE TESTING, CHECK THE ASPIRATING PUMP FOR LEAKS (REFER TO ITEM 8. INSPECTION OF ASPIRATING PUMP). ANY PUMPS SHOWING SIGNS OF LEAKAGE SHOULD BE CORRECTED BEFORE USE.
3. DO NOT USE THIS TUBE OUTSIDE THE STATED OPERATING TEMPERATURE RANGE.
4. STORE TUBES IN A COOL AND DARK PLACE (0-25 °C/32-77°F), AND USE BEFORE EXPIRATION DATE PRINTED ON THE TOP OF THE BOX.
5. PRIOR TO USE, READ CAREFULLY ITEM 10. USER RESPONSIBILITY.
6. READ THE CONCENTRATION IMMEDIATELY AFTER MEASUREMENT.

**2. SAMPLING AND MEASUREMENT:**

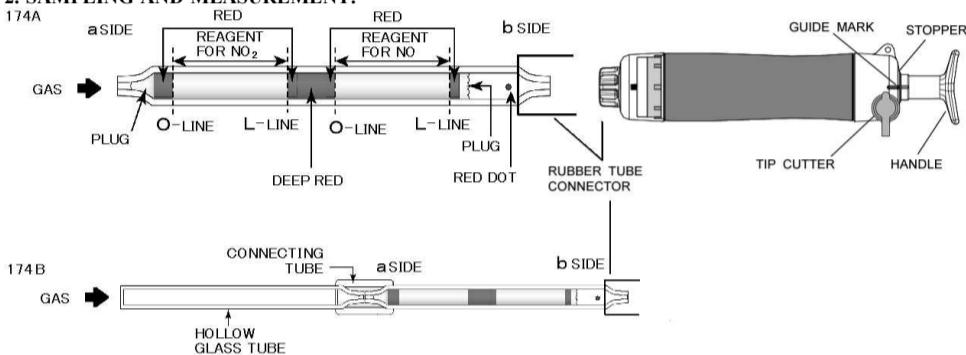


Fig.1

- ① Break both ends of the detector tube.

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

- ② Insert the end of the detector tube of the **b SIDE** into the aspirating pump securely as shown in Fig. 1.
- ③ Align the guide marks on the shaft and stopper of the aspirating pump.
- ④ Pull the pump handle at a full stroke until it locks and wait for 1.5 minutes or until the completion of sampling is confirmed with the flow indicator of the pump. (See descriptions about the flow indicator in the instruction manual of the pump.)
- ⑤ On completion of sampling, remove the detector tube from the pump and read a concentration with the concentration chart as shown in Fig. 3.

- ※ In case of 174B, connect the hollow glass tube to the detector tube with connecting tube as shown in Fig. 1 and Fig. 2.
- ※ The colour of the reagent for NO<sub>2</sub> is discoloured to pale yellowish orange with NO<sub>2</sub> and the colour of the reagent for NO is discoloured to yellowish orange with NO.

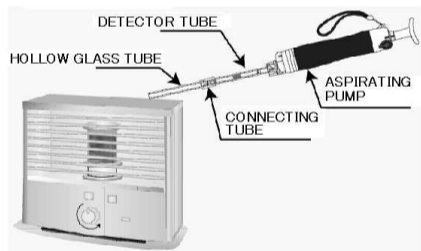


Fig. 2

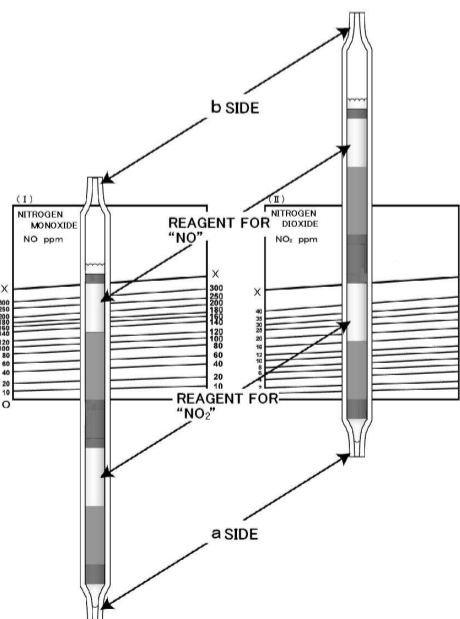


Fig. 3

※ Concentration charts are calibrated at 20 °C (68°F). A temperature correction tables are provided for other temperature.

1. Concentration charts ( I ), ( II ) for Nitrogen oxides are provided for reading each concentration of NO and NO<sub>2</sub> respectively.

2. Place the edge of the detecting reagent of the gas inlet side to the 0 - 0 line on the concentration chart and the other edge to the X - X line respectively to read out a each gas concentration of NO and NO<sub>2</sub> at the end of the discoloured layer as shown in Fig. 3.

3. To obtain actual NO<sub>2</sub> concentration in case of coexisting with NO, it is necessary to correct with NO value by the Table ( III ). (See descriptions about the correction in the Table ( III ).)

※ It is attached to Charts ( I ), ( II ), Table ( III ) and temperature correction tables in the box.

**SPECIAL NOTE:**

- I. The charts are calibrated at 20 °C (68°F), 50 %R.H. and 1013hPa. Readings obtained in other circumstances should be corrected (REFER TO ITEM 3. CORRECTION FOR AMBIENT CONDITIONS).
- II. When the maximum point of the stained layer is unclear or oblique, read the scale at the centre between the longest and shortest points.

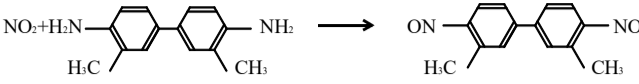
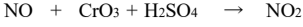
**3. CORRECTION FOR AMBIENT CONDITIONS:**

- ① Temperature; Correct the tube reading by NO and NO<sub>2</sub> temperature correction table. (See descriptions the NO and NO<sub>2</sub> temperature correction table.)
- ② Humidity; No correction is necessary.
- ③ Atmospheric Pressure; True concentration =  $\frac{\text{Temperature corrected concentration} \times 1013}{\text{Atmospheric pressure (in hPa)}}$

#### 4. INTERFERENCES:

Chlorine produces a similar stain and coexistence of more than 1ppm of them gives higher readings. Hydrogen, Carbon monoxide, Carbon dioxide, Sulphur dioxide, Ammonia, Hydrogen cyanide, Hydrogen sulphide, Hydrogen chloride, Acetylene, Ethylene, Propane, Benzene or Carbon tetrachloride does not affect the readings.

#### 5. CHEMICAL REACTION IN THE DETECTOR TUBE:



#### 6. DISPOSAL OF TUBES:

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

#### 7. HAZARDOUS AND DANGEROUS PROPERTIES OF :

NO TLV- TWA ◆: 25 ppm  
NO<sub>2</sub> TLV- TWA ◆: 3 ppm

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2008.

#### 8. INSPECTION OF ASPIRATING PUMP:

Checking for leaks;

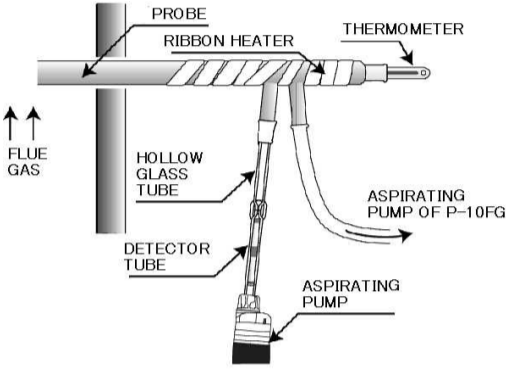
- ① Insert a sealed, unbroken detector tube into the pump.
- ② Align the guide marks on the shaft and stopper of the pump.
- ③ Pull the handle to a full stroke and wait for 1 minute.
- ④ Unlock the handle and allow it to return slowly into the pump by holding the cylinder and handle securely.

**CAUTION HANDLE WILL TEND TO SNAP BACK INTO THE PUMP QUICKLY.**

- ⑤ If the handle returns completely to the original position, the performance is satisfactory. Otherwise, refer to maintenance procedures shown in the instruction manual of the pump to correct the leakage.

#### 9. USAGE WITH THE MODEL P-10FG FLUE GAS SAMPLER (Sold separately)

P-10FG Flue Gas Sampler is suitable to analyze of flue gas like Nitrogen oxides and so on.



※ Connect the P-10FG, the detector tube 174B and Hollow glass tube as shown in Fig. 4.

※ In order to prevent absorption of gas in condensed water, wait until the indication of the thermometer becomes over 120 °C, then start the measurement.

※ MODEL P-10FG include the Probe, Ribbon heater, Thermometer, Aspirating pump of P-10FG and AP-20 Aspirating pump.

Fig. 4

#### 10. 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 AP-20, AP-20S, 400B, AP-1, AP-1S or 400A aspirating pump, and that detector tubes are not used which are either beyond their expiration date or have a colour change different to that stated in the Performance specifications.

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.