KITAGAWA
KOMYO RIKAGAKU KOGYO

INSTRUCTION MANUAL
n-HEXANE DETECTOR TUBE

No.113SB

(ISOBUTANE, ISOBUTYLENE, 2,2,4-TRIMETHYL PENTANE, HEPTANE, PENTANE, METHYL CYCLOHEXANE WITH CONVERSION CHART)

★ 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.

1. PERFORMANCE:

Gases to be measured with conversion chart: Isobutane, Isobutylene, 2,2,4-Trimethyl pentane, Heptane, Pentane, Methyl Cyclohexane

Measuring Range and Sampling Time	:	n-Hexane; 50-1,400ppm (Printed scale) (1 pump stroke, 1.5 minutes) Isobutane; 50-1,200ppm (1 pump stroke, 1.5 minutes) Isobutylene; 0.03-2.0% (1 pump stroke, 1.5 minutes) 2,2,4-Trimethyl Pentane; 100-1,400ppm (1 pump stroke, 1.5 minutes) 200-4,000ppm (1/2 pump strokes, 45 seconds) Heptane; 100-2,000ppm (1 pump stroke, 1.5 minutes) Pentane; 50-1,000ppm (1 pump stroke, 1.5 minutes) Methyl Cyclohexane; 100-1,600ppm (1 pump stroke, 1.5 minutes)
Colour Change	:	Orange → Yellowish green
Detectable Limit	:	5ppm (n-Hexane), 10ppm (Isobutane)
Operating temperature	:	0-40 ℃ (32-104°F) n-Hexane/Heptane (Temperature correction is necessary.) 0-40 ℃ (32-104°F) Isobutane/Pentane (No Temperature correction is necessary.) 20 ℃ (68°F) Isobutylene/2,2,4-Trimethyl pentane/Methyl Cyclohexane (No temperature correction is necessary.)
Aspirating Pump	:	Model AP-20, AP-20S, 400B, AP-1, AP-1S or 400A

CAUTION
1. DETECTOR TUBE CONTAINS REAGENTS (CHROMIUM OXIDE.).
2. DO NOT TOUCH THESE REAGENTS DIRECTLY ONCE TUBES ARE BROKEN.
3. KEEP THE TUBES OUT OF THE REACH OF CHILDREN.

NOTICE
1. USE ONLY PUMP MODELS AP-20, AP-20S, 400B, AP-1, AP-1S OR 400A. OTHERWISE, CONSIDERABLE ERROR IN INDICATION WILL OCCUR.
2. BEFORE TESTING, CHECK THE ASPIRATING PUMP FOR LEAKS (**REFER TO ITEM 9. INSPECTION OF ASPIRATING PUMP**). ANY PUMPS SHOWING SIGNS OF LEAKAGE SHOULD BE CORRECTED BEFORE USE.
3. DO NOT USE THIS TUBE BEYOND THE STATED OPERATING TEMPERATURE RANGE.
4. STORE TUBES IN A COOL AND DARK PLACE (0-25 ℃/32-77°F), AND USE BEFORE EXPIRATION DATE PRINTED ON 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:

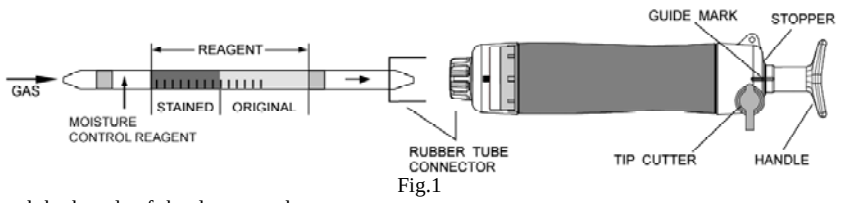


Fig.1

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 detector tube into aspirating pump securely as shown in Fig.1. (Arrow mark shall point to the pump.)
③ Align the guide marks on the shaft and stopper of the aspirating pump.
④ Pull pump handle to full stroke locked position and wait for 1.5 minutes or until the completion of sampling is confirmed with the flow indicator of the pump. (See descriptions of the flow indicator in the instruction manual of the pump).
⑤ On completion of sampling, read the scale at the maximum point of the stained layer.
⑥ Just in case of 2,2,4-Trimethyl pentane detection, if the discolouration is over the scale, change the tube and carry out the following 1/2 pump strokes procedure.
1) Insert the new tube to the pump inlet. Pull the pump handle at 1/2 strokes locked position (to 50mL line), and it will be automatically locked. Leave it for 45 seconds.
2) Remove the detector tube from the pump inlet and read the scale at the maximum point of the stained layer.

SPECIAL NOTE:
Ⅰ. The scale is calibrated at 20 ℃ (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 of the stained layer is unclear or obliquely, read the scale at the centre between the longest and shortest points.

3. CORRECTION FOR AMBIENT CONDITIONS:

① Temperature; Correct the tube reading by following temperature correction table.

Temperature Correction Table for n-Hexane

Tube Reading (ppm)	Corrected Concentration (ppm) 0 ℃ (32°F)	10 ℃ (50°F)	20 ℃ (68°F)	30 ℃ (86°F)	40 ℃ (104°F)
1400	1630	1530	1400	1270	1180
1200	1400	1320	1200	1090	1010
1000	1170	1100	1000	910	840
800	930	870	800	720	670
600	700	660	600	550	500
400	460	430	400	360	330
200	220	210	200	180	170
100	100	100	100	100	100

Temperature Correction Table for Heptane

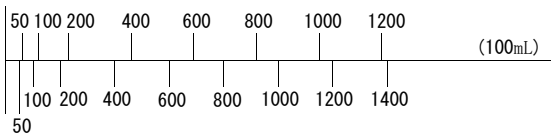
Tube Reading (ppm)	Corrected Concentration (ppm) 0 ℃ (32°F)	10 ℃ (50°F)	20 ℃ (68°F)	30 ℃ (86°F)	40 ℃ (104°F)
2000	—	—	2000	1680	1460
1600	—	2000	1600	1380	1200
1200	2000	1160	1200	1040	920
800	1200	940	800	720	660
400	520	460	400	360	320
200	260	230	200	180	160
100	100	100	100	100	100

② Humidity; No correction is necessary.
③ Atmospheric Pressure;

$$\text{True concentration} = \text{Temperature corrected concentration} \times \frac{1013}{\text{Atmospheric pressure (in hPa)}}$$

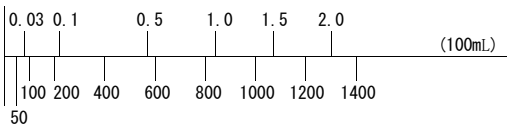
4. CONVERSION CHART:

Isobutane



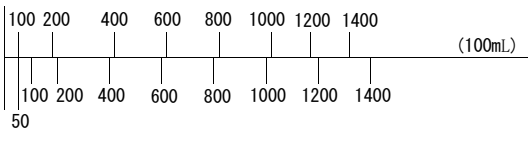
No.113SB tube reading (ppm)

Isobutylene



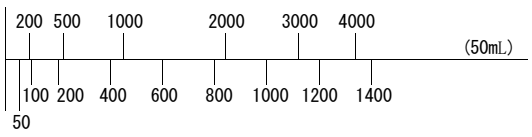
No.113SB tube reading (ppm)

2,2,4-Trimethyl Pentane (for 1 pump stroke)



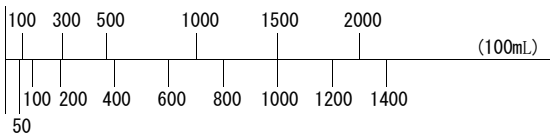
No.113SB tube reading (ppm)

2,2,4-Trimethyl Pentane (for 1/2 pump stroke)



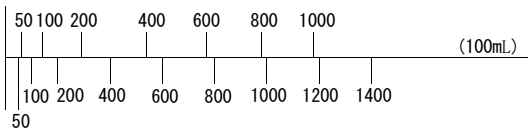
No.113SB tube reading (ppm)

Heptane



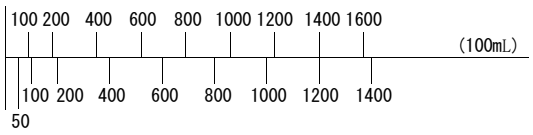
No.113SB tube reading (ppm)

Pentane



No.113SB tube reading (ppm)

Methyl Cyclohexane



No.113SB tube reading (ppm)

5. INTERFERENCE:

Alcohols, Esters and Ketones produce similar stains and coexistence of more than 6% of respectively with n-Hexane will give higher readings. Coexistence of Aromatic hydrocarbons produces a black stain in the bottom of the stained layer and will give higher reading. Paraffine produces a similar stain and will give higher reading.

6. CHEMICAL REACTION IN THE DETECTOR TUBE:

$$C_6H_{14} + Cr^{6+} + H_2SO_4 \rightarrow Cr^{3+}$$

7. DISPOSAL OF TUBE:

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

8. HAZARDOUS AND DANGEROUS PROPERTIES OF n-HEXANE, ISOBUTANE, HEPTANE AND PENTANE:

TLV-TWA.◆: n-Hexane; 50ppm Heptane; 400ppm Pentane; 600ppm
Explosive range in air: n-Hexane; 1.1-7.5% Isobutane; 1.8-8.5% Heptane; 1.0-6.7% Pentane; 1.4-7.8%

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2004.

9. 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 full stroke and wait for 1 minute.
④ Unlock the handle and allow it to return slowly into the pump with 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 procedure in the instruction manual of the pump to correct the leakage.

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.

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