

(DIISOBUTYL KETONE, METHYL AMYL KETONE WITH CONVERSION CHART)

- ★ READ THIS INSTRUCTION MANUAL AND THE INSTRUCTIONS OF THE ASPIRATING PUMP PRIOR TO USING THIS PRODUCT.
- ★ DO NOT DISCARD CAREFULLY THIS INSTRUCTION MANUAL UNTIL ALL THE TUBES IN THIS BOX ARE USED UP.

1. PERFORMANCE:

Measuring Range	: 20 - 1500 ppm
and Pump Stroke:	1 pump stroke
Sampling Time	: 1.5 minutes
Colour Change:	: Yellow → Pale blue
Detectable Limit:	: 10 ppm (Methyl ethyl ketone)
Operating Temperature:	: 10 - 40 °C (50-104°F) (Temperature correction is necessary.)
Aspirating Pump:	: Model AP-20, AP-20S, 400B, AP-1, AP-1S or 400A

By using conversion charts undermentioned (refer to **ITEM 4. CONVERSION CHART**), following gases can be detected.

Gases to Measured	Measuring Range	Number of Pump Stroke	Sampling Time
Diisobutyl ketone	20 - 1000 ppm	1 (100mL)	1.5 minutes
Methyl amyl ketone ※	25 - 350 ppm	3 (300mL)	4.5 minutes

※ Other name 2-Heptanone

Operating Temperature	: 15 - 25 °C (59-77°F) (No temperature correction is necessary.)
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⚠ 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 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 9. 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.
7. THE TOP OF THE DISCOLOURED LAYER IS BROWN. BUT READ THE SCALE AT THE MAXIMUM POINT OF THE PALE BLUE STAINED LAYER.

2. SAMPLING AND MEASUREMENT:

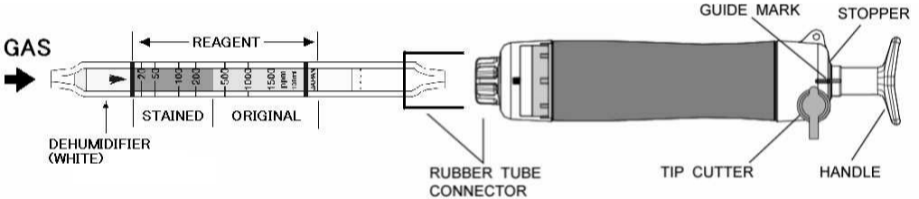


Fig.1

- 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 the 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 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, read the scale at the maximum point of the stained layer.
- ⑥ In case of measurement for Methyl amyl ketone, push back the handle without removing the detector tube from the pump inlet, turn it right or left 1/4 and repeat step ④~⑤ twice more.

SPECIAL NOTE:

- I. The scale is 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 following temperature correction table for Methyl ethyl ketone.

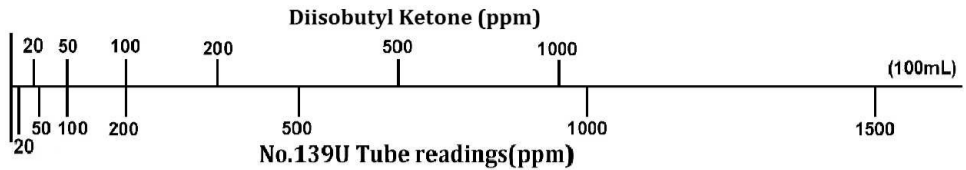
Tube Readings (ppm)	Temperature Correction Table						
	10 °C (50°F)	15 °C (59°F)	20 °C (68°F)	25 °C (77°F)	30 °C (86°F)	35 °C (95°F)	40 °C (104°F)
1500	2050	1750	1500	1260	1100	940	820
1000	1430	1200	1000	850	720	620	530
500	750	620	500	430	360	320	280
200	300	250	200	170	140	120	110
100	160	120	100	90	70	60	50
50	80	60	50	40	30	30	20
20	30	30	20	20	10	10	10

※ No temperature correction is necessary for Diisobutyl ketone and Methyl amyl ketone.

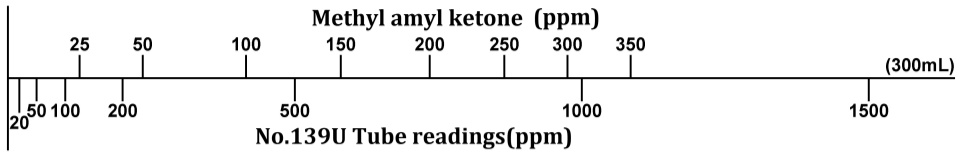
- ② Humidity; No correction is necessary.
- ③ Atmospheric Pressure; True concentration = Temperature corrected concentration × $\frac{1013}{\text{Atmospheric pressure (in hPa)}}$

4. CONVERSION CHART

DIISOBUTYL KETONE



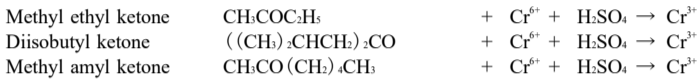
METHYL AMYL KETONE



5. INTERFERENCES:

Alcohols, Esters, Ketones or Aromatic hydrocarbons produce similar or brown stains and coexistence of them with Methyl Ethyl ketone give higher readings. Although coexistence of Aliphatic hydrocarbons or Halogenated hydrocarbons change the colour of the whole reagent to pale brown, but the reading can be obtained if the top of the maximum point of pale blue stain is clear.

6. CHEMICAL REACTION IN THE DETECTOR TUBE:



7. DISPOSAL OF TUBES:

USED TUBES SHOULD BE DISPOSED CAREFULLY IN ACCORDANCE WITH RELEVANT REGULATIONS, IF ANY.

8. HAZARDOUS AND DANGEROUS PROPERTIES OF :

Methyl ethyl ketone	TLV-TWA ◆ : 200 ppm	Explosion range in air: 1.7 - 11.5 %
Diisobutyl ketone	TLV-TWA ◆ : 25 ppm	Explosion range in air: 0.8 - 6.2 %
Methyl amyl ketone	TLV-TWA ◆ : 50 ppm	Explosion range in air: 1.1 - 7.9 %

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2015.

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 a 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 procedures shown 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.

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

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