KITAGAWA
KOMYO RIKAGAKU KOGYO

INSTRUCTION MANUAL
DETECTOR TUBE FOR HYDROGEN CYANIDE (HCN) IN CARBON DIOXIDE (CO_2)

No. 112HCN

★ CAREFULLY READ THIS INSTRUCTION SHEET AND AIRBORNE LABS INTERNATIONAL (*ALI*) MANIFOLD METHOD INSTRUCTIONS PRIOR TO USING THIS PRODUCT THAT IS DESIGNED FOR CARBON DIOXIDE (CO_2) TESTING.

★ THIS DETECTOR TUBE IS DESIGNED AND CALIBRATED FOR USE ONLY WITH THE *ALI* MANIFOLD SYSTEM. IT IS NOT INTENDED FOR USE WITH A HAND OPERATED PUMP.

★ DO NOT DISCARD THIS INSTRUCTION SHEET UNTIL ALL THE TUBES IN THIS BOX ARE USED UP.

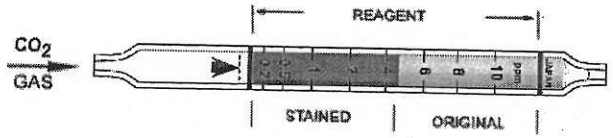
1. PERFORMANCE:

Measuring Range HCN in CO_2 Gas	: 0.2 - 10 ppm v/v (*)
(*) Graduations on the detector tube are based on a 900 cc gas sample volume.	
Maxmum Manifold Test Pressure	: 20 psig **(DO NOT EXCEED!!)**
Manifold Flow rate / Time / Volume	: 225 cc/min for 4.0 min = 900 cc
Colour Change	: Yellow → Red
Detectable Limit	: 0.1 ppm v/v (@900 cc gas sample)
Operating Temperature	: 20 - 30 ℃ (68 - 86°F) (No correction is necessary.)

⚠CAUTION
1. DETECTOR TUBE CONTAINS CHEMICAL REAGENTS.
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 *ALI* PASSIVATED GAS MANIFOLDS.(GAS-1 OR GAS-5XL SERIES) OTHERWISE, CONSIDERABLE ERROR IN INDICATION MAY OCCUR.
2. BEFORE TESTING, CHECK THE MANIFOLD AS PER *ALI* OPERATING INSTRUCTIONS.
3. DO NOT USE THIS TUBE OUTSIDE THE STATED OPERATING TEMPERATURE RANGE.
4. STORE TUBES IN A REFRIGERATED PLACE (4-10 ℃/39-50°F) , AND USE BEFORE EXPIRATION DATE PRINTED ON TOP OF THE BOX.
5. **PRIOR TO USE, READ CAREFULLY ITEM 7. USER RESPONSIBILITY.**
6. READ THE CONCENTRATION IMMEDIATELY AFTER A MEASUREMENT.

2. SAMPLING AND MEASUREMENT:



DETECTOR TUBE

Fig.1

① Ensure that the proper 20 psig manifold delivery pressure is set, then briefly purge the transfer line and manifold with sample gas flow as per *ALI* instructions.
② Using a Cutter Tool, break open both ends of the detector tube and properly discard the broken ends.

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

③ Insert the detector tube into the rubber manifold channel sleeve (Flow Direction Arrow must point UPWARD - away from this sleeve).
④ Connect the manifold cap assembly to the detector tube's outlet end.
⑤ Ensure the manifold timer is set for a 4.0 minute test period.
⑥ Start the gas flow and quickly adjust the gas flow metering valve to achieve 225 cc/min constant flow.
⑦ On completion of the test period, shut off the gas flow and read the scale at the maximum point of the stained layer.
REMARKS: The whole reagent should remain yellow if hydrogen cyanide is not present.
⑧ If hydrogen cyanide is present a red discoloration stain will appear up to the reading concentration.

SPECIAL NOTE

Ⅰ. The floating ball flowmeters used on gas manifolds are calibrated at 20℃ (68°F) and 760 mm Hg (1013 hPa). Flowball readings obtained under other circumstances should be corrected accordingly. **(REFER TO ITEM 3. SCALE CORRECTION FOR NON-STANDARD TEMPERATURE AND FLOWMETER BALL POSITION CORRECTION FOR LOW ATMOSPHERIC PRESSURE.)**

Ⅱ. When the maximum point of the stained layer is unclear or obliquely, read the scale at the center between the longest and shortest points.

3. SCALE CORRECTION FOR NON-STANDARD TEMPERATURE CONDITIONS:
① Temperature; No correction is necessary.
② Humidity; Dry CO_2 gas employed- No correction is necessary.
③ Atmospheric Pressure ; (If testing is performed at a high altitude location, the manifold flowmeter ball position for a true 225 cc/min CO_2 flow must be adjusted accordingly from that obtained at sea level 760 mm Hg conditions). Use of a pressure correction type flowmeter is required for a ball flowmeter / altitude effect adjustment.

4. INTERFERENCE.
Coexistence of sulphur dioxide, hydrogen sulphide, phosphine respectively with hydrogen cyanide will give a higher reading. In case that ammonia coexists, these will be no discolouration even if hydrogen cyanide exists, or lower reading will be given.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:
$2HCN + HgCl_2 \rightarrow 2HCl + Hg(CN)_2$

6. DISPOSAL OF TUBES:
IF APPLICABLE, USED TUBES SHOULD BE DISPOSED OF ACCORDING TO RELEVANT LOCAL REGULATIONS.

7. 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 detector tube instructions and the instructions provided by *ALI* for their gas manifold models. Detector tubes should not used which are either beyond their expiration date or show a color change different from 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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