

KITAGAWA

GAS DETECTOR TUBE SYSTEM



Accurate reading in minutes
Portable, safe, easy to use
No power supply or calibration required
Low cost analysis for your gas detection needs

KITAGAWA HISTORY IS A HISTORY OF DETECTOR

KITAGAWA GAS DETECTOR TUBE SYSTEM started with a H₂S tube for quality control in year 1947 and has led a path in a field of gas analysis.

KITAGAWA GAS DETECTOR TUBE SYSTEM COMPRISES OF 「DETECTOR TUBES」 AND

「SAMPLING PUMP」

GAS DETECTOR TUBES

change colours when chemical reagents filled in a glass tube react with sampled target gas through the tube. The stain created is proportional in length to the concentration of the target gas, so the concentration is read directly off the printed scale on the tube. Kitagawa offers about 250 kinds of tubes to measure about 400 different kinds of tubes and ranges.

AP-20 SERIES

A SHATTERPROOF DETECTOR TUBE

has 2-layer of films to protect from a breakage.
Even if broken, the inside reagents do not scatter.
(patent no.4100883)

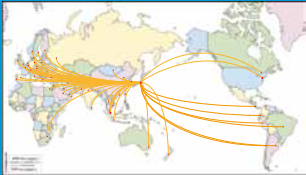
SAMPLE FINISH INDICATOR

is easy to check the sampling completes.

ANTIBACTERIAL NONSKID GRIP
offers a hand fit easily and is light to pull.

- Designed and manufactured at certified factory by ISO9001(Quality management system) and ISO14001(Environmental Management System)
- Japan design registration No.1131898
- United States Design Patent No.US D467, 334 S

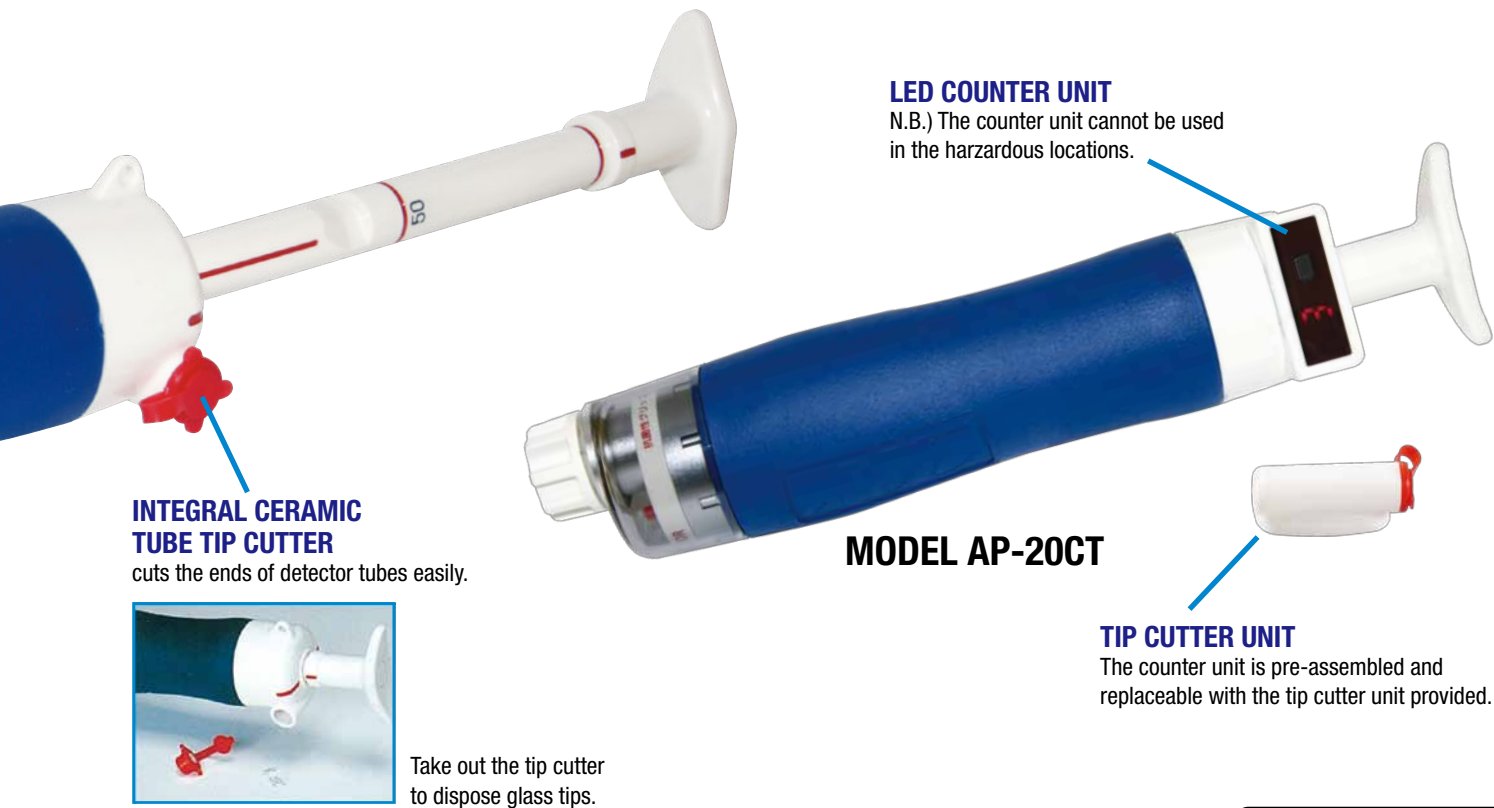
TUBES



KITAGAWA GAS DETECTOR TUBES
ARE USED ALL OVER THE WORLD.

SAMPLING PUMP

A portable sampling pump to suction a constant amount of target gas into the detector tubes.
Safe, light and easy to use. No power supply is required. Accurate toxic gas measurement in minutes.
A sampling pump with a counter unit is useful where multiple pump strokes are applicable.



**INTEGRAL CERAMIC
TUBE TIP CUTTER**
cuts the ends of detector tubes easily.



Take out the tip cutter
to dispose glass tips.

LED COUNTER UNIT
N.B.) The counter unit cannot be used
in the hazardous locations.

MODEL AP-20CT

TIP CUTTER UNIT
The counter unit is pre-assembled and
replaceable with the tip cutter unit provided.

SAMPLING PUMP AP-20 / AP-20CT KIT INCLUDES;



SPECIFICATION



MODEL:AP-20
INNER VOLUME:100mL
WEIGHT:APPROX.290g
LENGTH:APPROX.240mm

● The AP-20 Series Pump is available in four different colours.

HOW TO USE GAS DETECTOR TUBES

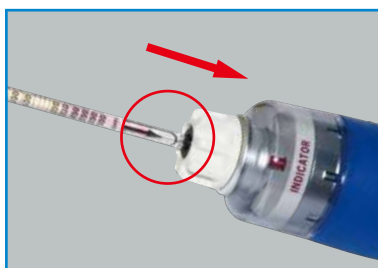
Read the instruction manual for each detector tubes and sampling pump before use.

Check our website for the usage at www.komyokk.co.jp/en/.

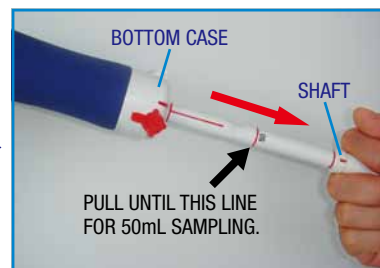
Use the detector tube by the expiration date printed on top of the tube box.



- ① Scroll both ends of tube with a tip cutter to open the tube.



- ② Insert the tube into the inlet of the pump with an arrow mark pointing to the pump.



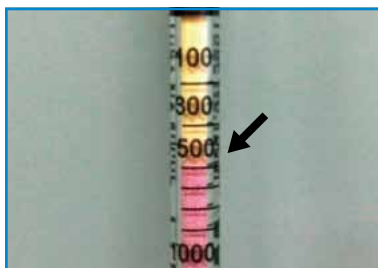
- ③ Align the red lines on the shaft and the bottom case and pull the handle until full to lock.

Wait until sampling completes

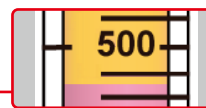
※Sampling time varies on tubes.
Read the instruction manual for each tubes for the sampling time.



- ④ Take the sample.
(Wait for 5 seconds after the indicator pops up.)



- ⑤ Take out the tube and read out the end point of discolouration layer to know the concentration.



When the end point is between the scales, prorate to read out.



Slanted stain:
read the gas concentration at the middle of **A** and **B**



Wavy stain:
read the gas concentration at the middle of **A** and **B**



Faint discolouration:
read the gas concentration at the discernable end **A** of the stain



- For more than 200mL sampling, return the handle and repeat procedure ③ and ④.

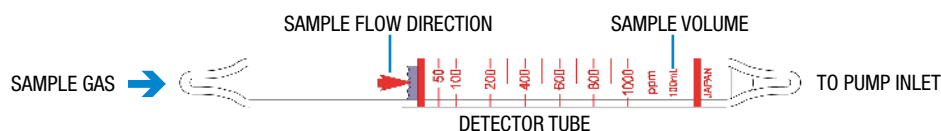
『Temperature correction for tubes』 enables temperature correction easily.

- ① Enter Tube no.
- ② Select sampling volume where applicable
- ③ Enter temperature
- ④ Hit correct to confirm the corrected value

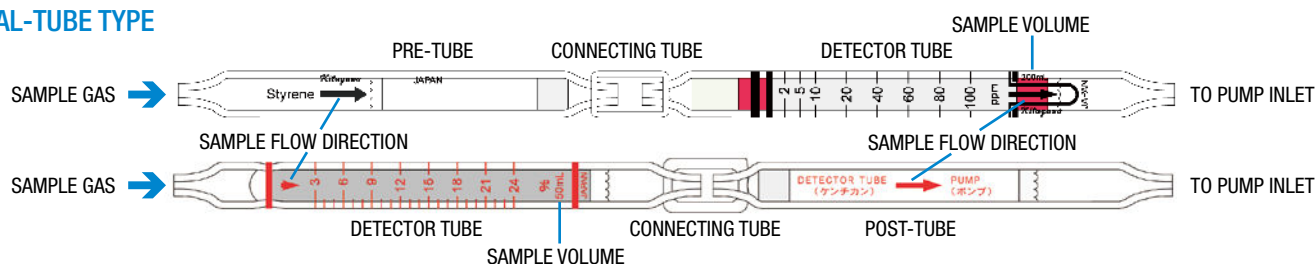


Website: www.komyokk.co.jp/en/

GAS DETECTOR TUBE DESCRIPTION



DUAL-TUBE TYPE



※The connecting tube is packed in the tube box of a dual-tube type.

Useful options for Kitagawa gas detector tube system

Rubber Extension Hose SH-5N/SH-10N
SH-20N/SH-20C



For remote sampling to draw samples from hazardous or confined spaces such as tanks, manholes, ship holds, etc.

Length : 5m(SH-5N)
10m(SH-10N)
20m(SH-20N/SH-20C)
SH-20C is for a dual-tube type.



Extension Sampling Rod SR-200R



To enable gas detection vertically and horizontally at hazardous areas or confined spaces where workers cannot enter or unreachable places.

Maximum length : Approx.2.2m

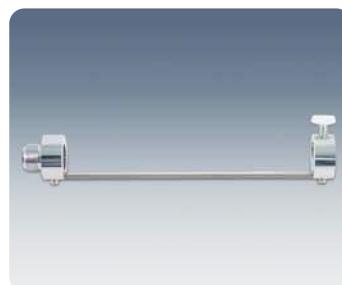
Hot Air Probe SF-40



For sampling high temperature gas such as emission gas from gas fittings or automobiles.

Length : 40cm
Operating temp. : Below 600°C

Hot Air Probe Holder SFH-01



To provide a stable connection of sampling pump and hot air probe.



Remove the connector holder of the sampling pump and connect the hot air probe holder and the sampling pump. Break both ends of the detector tube and connect to the hot air probe. Open the screw knob and insert the detector tube into the hot air probe holder. Insert the detector tube into the rubber tube connector of the sampling pump, then close the screw knob.

Glass Syringe SS-100/SS-200



For sampling high temperature gas, momentary concentration or diluting high concentration gas.

Volume : 100mL(SS-100)
1200mL(SS-200)

Sampling Probe for gases in Soil SPG-1/SPG-1N



For simple check of chlorinated organic solvents contamination in soil.

Length : 1m

SPG-1N is for a dual-tube type.

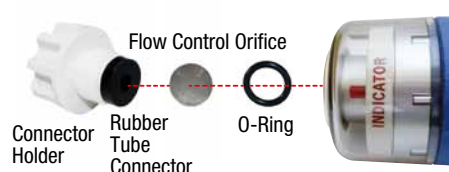
A boring bar is required to dig a hole into the soil.

Tip Cutter B-191



To break the ends of detector tubes and prevent scattering of glass fragments. Transparent container easily lets you know the amount of fragments.

Air Flow Control Orifice with O-ring 20K



Some detector tubes require air flow control orifice to use.

HOW TO READ LIST OF KITAGAWA PRECISION GAS DETECTOR TUBES

Gas to be measured

The concentration of the target gas is read directly off the printed scale or by using a concentration chart packed in a tube box.

Tube No.

Tube numbers are listed in descending order of high concentration.
 © after tube no. means the concentration is read by using a conversion chart.

Measuring range & No. of Pump Strokes

In case where multiple measuring ranges apply, ○ mark indicates the scale printed on the tube.
 Example: Tube No. 126SF Measuring range(ppm) No. of Pump Strokes
 200~4,000 1/2
 (100~2,000) ①

Shelf life(year)

The shelf life starts from the date manufacturing started.

Q'ty of tubes/box

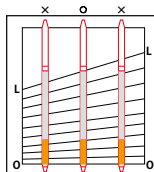
Most tubes come in a box of 10 tubes to make 10 times measurement per box.
 2 x 5 or 3 x 5 tubes come in a box of 5 detector tubes and 5/10 pre or post tubes to make 5 times measurement per box.

Threshold limit value

TLV(J):Occupational Exposure Limits(OELs) recommended in Journal of Occupational Health issued by The Japan Society for Occupational Health (2020-2021).
 ():provisional value *:Maximum Allowable Concentration
 TLV(A):TLV-TWA. Threshold Limit Values for Chemical Substances in the Work Environment adopted by ACGIH(American Conference of Governmental Industrial Hygienists).
 ():intended changes for 2021 C:TLV-C(ceiling value)
 STEL:TLV-STEL(short-term exposure limit(15 minutes reference period))
 TLV(B):Workplace Exposure Limits(WELs) listed on guidance Note EH40/2005(fourth edition 2020) from HSE(Health and Safety Executive) in U.K.

Concentration chart type

Align the zero end of the detecting reagent with O-O line on the chart and the other end of the layer with the L-L line. Read the gas concentration at the maximum end of the stain against the scale on the chart.



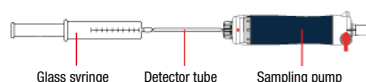
Colour chart type

Measure the gas concentration by comparing to the colour standard.



Measuring high concentration gas exceeding the measuring range of detector tubes

Collect a volume of sample gas into a glass syringe and dilute with fresh air. The tube reading is then multiplied by the ratio of dilution to determine the actual concentration.



Measuring in an atmosphere under pressure or reduced pressure

If 100mL of gas is collected at a pressure that is two times atmospheric pressure, it is equivalent to 200mL of gas collected at normal atmospheric pressure. When measuring at pressures other than normal atmospheric pressure, a pressure correction is required. Therefore it is recommended to collect the sample in a gas sampling bag, then measure it at normal atmospheric pressure for more accurate readings.

Gas to be measured (Synonym) Chemical Formula	Tube No.	Measuring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
Acetaldehyde CH ₃ CHO Concentration chart method	133A ‡	0.004~1.0%	1	Yellow	Pink	Mfg. synthetic rubber, plastics, various organics, perfume, flavors, fragrances	1	10	Acetone (1,400), Acrolein (35), Methyl ethyl ketone (900), Methyl isobutyl ketone (2,900), SO ₂ (10)	50* (J) C25 (A) 20 (B)
Acetaldehyde CH ₃ CHO	133SB ‡	5~140	1	Yellow	Pink	Mfg. synthetic rubber, plastics, various organics	2	10	Other aldehydes, Ethanol	
	133SC	1~30	1	Pink	Pale yellow	Measuring deodorizing performance of fiber	3	10	Formaldehyde (10), Ethanol(0.2)	
Acetic acid CH ₃ COOH	216S	1.25~125 (0.5~50)	1/2 ①	Pale pink	Yellow	Mfg. cellulose acetate rayon, vinyl acetate, a seasoning	3	10	SO ₂ (1/20 × Acetic acid *), NO ₂ (10), HCL (2 × Acetic acid *), Cl ₂ (5)	10 (J.A.B)
Acetic anhydride (CH ₃ CO) ₂ O	216S©	1~15	1	Pale pink	Yellow	Acetylating agent	3	10	SO ₂ (1/20 × Acetic acid *), NO ₂ (10), HCL(2 × Acetic acid *), Cl ₂ (5)	5* (J) 1 (A) 0.5 (B)

‡ This tube must be stored in a refrigerated place (0-10°C/32-50°F).

* Interfered by coexistence more than parenthesized rate.

Gas to be measured (Synonym) Chemical Formula	Tube No.	Measuring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
Acetone CH ₃ COCH ₃	102SA	1.0~5.0% 0.1~2.0%	1/2 ①	Orange	Dark brown	Leakage & fire hazard detection in acetate rayon industry, paints industry & pharmaceutical industry	3	10	Alcohols, Other Ketones, Aromatic hydrocarbons, Esters, Halogenated hydrocarbons (0.5%)	200 (J) 250 (A) 500 (B)
	102SC ‡	0.01~4.0%	1	Yellow	Pink		1	10	Acetaldehyde (30), Acrolein (20), Methyl ethyl ketone (150), Methyl isobutyl ketone (400)	
	102SD	125~5,000 50~2,000 20~800	1/2 ① 2	Yellow	Dark brown	Industrial hygiene for both plant and laboratory	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	
Acetylene HC≡CH	101S	50~1,000	1	Pale yellow	Brownish blue	Process control & leakage detection in synthetic ammonia plant, cuprammonium rayon process	3	10	Olefins (10), H ₂ S (10), CO (50), NH ₃ , Butadiene (25), HCH, Cl ₂ , NO ₂ , CS ₂ , Benzene	
Acetylene · Ethylene -separation measurement HC≡CH, H ₂ C=CH ₂	280S †	HC≡CH; 20~300	1	Yellow	Dark brown		1	2 × 5	Tube for HC≡CH; CO (10), H ₂ (5,000), Ethylene (2,000) Tube for H ₂ C=CH ₂ ; CO (1,350), Acetylene (370), Propylene (20)	
		H ₂ C=CH ₂ 200~2,000		Pale yellow	Blue					
Acrolein (Acryl aldehyde) CH ₂ =CHCHO Concentration chart method	136 ‡	0.005~1.8%	1	Yellow	Pink	Leakage & fire hazard detection in plastics industry	1	10	Acetylene (20), Acetaldehyde (70), Methyl ethyl ketone (60), Methyl isobutyl ketone (500)	0.1 (J) 0.1 (A) 0.02 (B)
Acrylic acid CH ₂ =CHCOOH	216S©	1~50	1	Pale pink	Yellow	Material of acrylic resin	3	10	SO ₂ (1/20 × Acetic acid *), NO ₂ (10), HCl (2 × Acetic acid *), Cl ₂ (5)	2 (A) 10 (B)
Acrylonitrile (Vinyl cyanide) CH ₂ =CHCN	128SA	0.1~3.5%	1	Orange	Dark green	Leakage & fire hazard detection in synthetic rubber & plastics industry	3	10	Acetylene (3%), Propane (0.2%), Other organic gases or vapours except Halogenated hydrocarbons (50)	2 (J.A.B)
	128SB	10~500	1	Yellow	Pale blue or Brown	Leakage detection	2	10		
	128SC ‡	1~120	2	Yellow	Pink	Industrial hygiene (suspected human carcinogen)	1	2 × 5	Methyl ethyl ketone (600), Styrene (250), HCN (2), Butadiene (200)	
	128SD ‡	1~20 0.5~10 0.25~5 0.2~4	① 2 4 5	Yellow	Red		1	2 × 5	HCN	
Allyl alcohol CH ₂ =CHCH ₂ OH	184S©	20~500	1	Yellow	Pale blue	Leakage detection	2	10	Esters, Ketones, Alcohols, Aromatic hydrocarbons, Halogenated hydrocarbons	1 (J) 0.5 (A) 2 (B)
Allyl chloride CH ₂ =CHCH ₂ Cl	132SC©	1~40	3	Yellowish green	Pink		3	2 × 5	HCl(500), Acetylene(4%), Ethylene(400), Cl ₂ (50)	1(A)
Ammonia NH ₃	105SH	0.5~30%	1	Pink	Blue or Brownish green	Process control & leakage detection in synthetic ammonia plant, cuprammonium rayon process, fertilizer mfg.	3	10	H ₂ S (3,000)	25 (J.A.B)
	105SA	0.5~10%	1	Pink	Grey or Yellow		3	10	Amines	
	105SM	0.1~1.0%	1	Pale purple	Pale yellow	Process control	2	10	Amines	
	105SB	50~900	1	Pale purple	Pale yellow		3	10	SO ₂ (1/4 × NH ₃ *), Cl ₂ (2), Amines	
	105SC	10~260 5~130	① 2	Pale purple	Pale yellow	Synthetic ammonia plant, leakage detection of refrigerant in ice plant, industrial hygiene	3	10	SO ₂ (1/5 × NH ₃ *), Cl ₂ (2), Amines	

‡ This tube must be stored in a refrigerated place (0-10°C/32-50°F).

† Air flow control orifice is required.

* Interfered by coexistence more than parenthesized rate.

LIST OF KITAGAWA PRECISION GAS DETECTOR TUBES

Gas to be measured (Synonym) Chemical Formula	Tube No.	Measuring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
Ammonia NH ₃	105SE	10~200 5~100 1~20	1/2 ① 5	Pale purple	Pale yellow	Synthetic ammonia plant, leakage detection of refrigerant in ice plant, industrial hygiene	3	10	Sulphur dioxide, Chlorine, Amines	25 (J.A.B)
	105SD	1~20 0.5~10 0.2~4	① 2 5	Pale purple	Pale yellow		3	10	Amines	
Aniline (Aminobenzene) C ₆ H ₅ NH ₂	181S	2~30 1~15	① 2	White	Yellow	Industrial hygiene	3	10	Toluidine (1/3 × Aniline *), NH ₃ , Aliphatic amines or Aromatic amines (the same conc. of Aniline)	1 (J.B) 2 (A)
Arsine AsH ₃	140SA	5~160	1	White	Dark brown	Doping gas analysis in semiconductor industry, waste gas analysis in metal refinery	2	10	H ₂ S (5), Hydrogen selenide (5), Phosphine (5)	0.01 (J) 0.005 (A) 0.05 (B)
	121U	0.1~2.0 0.05~ 1.0	① 2	Pale yellow	Pink	Industrial hygiene, semiconductor mfg. process	2	10	Hydrogen selenide, Mercaptans, H ₂ S, HCN, SO ₂	
Benzene- in the presence of Gasoline and/or other Aromatic hydrocarbons C ₆ H ₆	118SB	5~300	1	White	Greenish brown	Industrial hygiene (suspected human carcinogen)	2	2 × 5	Toluene (over 150), Hexane (200), Xylene (over 300)	1 (J.B) 0.5 (A)
	118SE	1~80 0.2~1	① 5	White	Brown		2	2 × 5	Toluene (1,000), Xylene (1,000), Ethyl benzene (1,000), CO (2), Hexane (2)	
Benzene C ₆ H ₆	118SC	4~100 2~50 1~25	1 ② 4	White	Greenish brown		2	10	Toluene, Xylene, CO (50), Hexane (100)	
	118SD	1~75 0.2~15 0.1~7.5	1 ⑤ 10	White	Greenish brown		2	2 × 5	Toluene, Xylene, CO (2.0), Hexane (2.0)	
Benzyl chloride C ₆ H ₅ CH ₂ Cl	132SC©	1~16	1	Yellowish green	Pink	Mfg. fragrance, pharmaceuticals, dye	3	2 × 5	HCl(500), Acetylene(4%), Ethylene(400), Cl ₂ (50)	1(A) 0.5(B)
Bromine Br ₂ Concentration chart method	114	1~20	1	White	Orange	Industrial hygiene	2	10	Cl ₂ (1), ClO ₂ , NO ₂	0.1 (J.A.B)
Bromochloromethane CH ₂ BrCl	157SB© ‡	2~80 20~400	① 1/2	White	Yellow		3	2 × 5		200 (A)
Bromoform CHBr ₃	157SB© ‡	1~20 0.5~9	① 2	White	Yellow		3	2 × 5		1 (J) 0.5 (A)
1-Bromopropane CH ₃ CH ₂ CH ₂ Br	157SB© ‡	5~80	1	White	Yellow		3	2 × 5		0.5 (J) 0.1 (A)
2-Bromopropane (CH ₃) ₂ CHBr	157SB© ‡	5~80	1	White	Yellow		3	2 × 5		1 (J)
1,3-Butadiene CH ₂ =CHCH=CH ₂	168SA	0.03~ 2.6%	1	Brownish orange	Dark brown	Process control & fire hazard detection in synthetic rubber industry, mfg. synthetic rubber	3	10	Other organic gases or vapours except Halogenated hydrocarbons (50), Propane (0.2%), Acetylene (3%)	2 (A) 1 (B)
	168SB	30~600	1	Pale yellow	White	Leakage detection in synthetic rubber industry	3	10	CO, Butane, Pentane, Ethylene, Propylene, Butylene, H ₂ S, Benzene, NH ₃ , HCN	
	168SC	5~100 2.5~50	① 2	Pale yellow	Pale blue		1	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	
	168SE	0.5~10.0 0.1~2.0	1 ④	Pink	White		3	2 × 5	H ₂ S, Isobutylene, NH ₃	

‡ This tube must be stored in a refrigerated place (0-10°C/32-50°F).

Gas to be measured (Synonym) Chemical Formula	Tube No.	Mea- suring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
n-Butane $\text{CH}_3(\text{CH}_2)_2\text{CH}_3$	221SA	0.05~ 0.6%	1	Orange	Brown	Combustible gas detection	3	10	Toluene, Hexane, Trichloroethylene	500 (J) STEL1,000 (A) 600 (B)
1-Butanol (n-Butyl alcohol) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$	190U©	5~100	3	Yellow	Pale blue	Mfg. flotation reagent, stabilizer for solvent, industrial hygiene	2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	50* (J) 20 (A) -(B)
2-Butanol (sec-Butyl alcohol) $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$	189U	10~300 4~120	② 4	Yellow	Pale blue	Organic solvent treating, industrial hygiene	2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	100 (J.A.B)
tert-Butanol $(\text{CH}_3)_3\text{COH}$	111U©	20~500	1	Yellow	Brown	Organic solvent treating, industrial hygiene	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	50 (J) 100 (A)
Butyl acetate $\text{CH}_3\text{CO}_2\text{C}_4\text{H}_9$	139SB©	0.01~ 1.0%	2	Orange	Brownish green	Leakage & fire hazard detection in paints industry & painting, printing inks, artificial leather synthetic dyes, drugs & perfumes	3	10	Acetylene (3%), Propane (0.2%), Other organic gases or vapours except Halogenated hydrocarbons (50)	100 (J) 50 (A) 150 (B)
	138U	10~400	1	Pale yellow	Pale blue	Industrial hygiene	1	10	Other organic gases or vapours	
Butyl acrylate $\text{CH}_2=\text{CHCO}_2(\text{CH}_2)_3\text{CH}_3$	211U	5~60	2	Yellow	Pale blue	Material of acrylic resin	2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	2 (A) 1 (B)
n-Butyl amine $\text{C}_4\text{H}_9\text{NH}_2$	105SD©	1~20	1	Pale purple	Pale yellow	Organic synthesis intermediate, mfg. insecticide, emulsifying agent, medicine	3	10	Amines	5* (J) C5 (A)
Butyl cellosolve (Ethylene glycol monobutyl ether/2-Butoxyethanol) $\text{C}_4\text{H}_9\text{OCH}_2\text{CH}_2\text{OH}$	190U©	10~ 1,000	3	Yellow	Pale blue	Organic solvent treating industrial hygiene	2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	20* (J) 20 (A) 25 (B)
Butyl ether $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$	111U©	10~1,200	1	Yellow	Brown	Organic solvent treating industrial hygiene	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	
tert-Butyl mercaptan $(\text{CH}_3)_3\text{CSH}$	130U	1.1~11.0 0.55~5.5 0.11~1.10	1/2 1 5	Pale yellow	Pink	Industrial hygiene	2	10	Arsine, Hydrogen selenide, H_2S , HCN , PH_3	
	165SB	5~80 2.5~40	(1/2) 1	Yellow	Pink		2	10	H_2S , PH_3 , Arsine, Hydrogen selenide, HCN , NO_2 , NH_3 , SO_2 , Other Amines	
Butyl methacrylate $\text{CH}_2=\text{C}(\text{CH}_3)\text{COOC}_4\text{H}_9$	111U©	20~ 1,000	1	Yellow	Brown	Organic synthesis intermediate, mfg. synthetic resin, lubricant additive, rust-proof for metal, paper coating agent	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	
tert-Butyl methyl ether (MTBE) $(\text{CH}_3)_3\text{COCH}_3$	111U©	25~500	1	Yellow	Brown	Fuel, powder, blast cell, antiknock, solvent, abstergent	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	50 (A)
n-Butyric acid $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$	216S©	3~60	1	Pale pink	Yellow	Conflate artificial flavour, medicine; emulsifying agent	3	10	SO_2 (1/20 × Acetic acid *), NO_2 (10), HCl (2 × Acetic acid *), Cl_2 (5)	
Carbon dioxide -ultra high range CO_2	126UH	5~50%	1/2	White	Purple	Industrial hygiene	2	10		5,000 (J.A.B)
Carbon dioxide -extra high range CO_2	126SH	1~20%	1	Pink	Yellow	Combustion gas analysis	2	10	SO_2 (3,000), H_2S (3,000), NO_2 (50)	

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LIST OF KITAGAWA PRECISION GAS DETECTOR TUBES

Gas to be measured (Synonym) Chemical Formula	Tube No.	Measuring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
Carbon dioxide CO ₂	126SA	0.2~5.2% 0.1~2.6%	1/2 ①	Purple blue	Pale pink	Air contamination test in buildings, closed vessels, tunnels, other confined spaces, CO ₂ concentration control in green houses, poultry farm, fruit storage	2	10	HCN (200), Cl ₂ (100), SO ₂ (500), H ₂ S (100)	5,000 (J.A.B)
	126SG	0.04~1.4% 0.02~0.7%	1/2 ①	Pink	Yellow		2	10	HCN	
	126SB	0.05~1.0% 0.021~0.42%	① 2	Purple blue	Pale pink		2	10	HCN (100), Cl ₂ (200), SO ₂ , H ₂ S (150), NO ₂	
Carbon dioxide CO ₂ Concentration chart method	126B	0.03~0.7% 100~1,500	① 3	Purple blue	Pale pink	Industrial hygiene	2	10	HCN (100), Cl ₂ (200), SO ₂ , H ₂ S (150), NO ₂	
Carbon dioxide CO ₂	126SF	200~4,000 100~2,000	1/2 ①	Pink	Yellow		2	10	HCN(30), Cl ₂ (15), SO ₂ (100), H ₂ S(10), HCl(30), NO ₂ (5)	
Carbon disulphide CS ₂	141SA ‡	30~500	1	Pink	Yellow	Mfg. & recovery control in viscose rayon & cellophane plant	2	2 × 5	H ₂ S (400), SO ₂ , Cl ₂	1 (J.A) 5 (B)
	141SB ‡	2~50 0.8~20	② 4	Pink	Yellow	Industrial hygiene	3	2 × 5	H ₂ S (120), SO ₂ , Cl ₂	
	141SC ‡	0.1~3.0 0.2~6.4	④ 2	Pale purple	Pale yellow		1	2 × 5	H ₂ S(40), SO ₂ , Cl ₂	
Carbon monoxide -ultra high range CO	106UH	0.2~20% 0.1~10%	1/2 ①	White	Dark brown	Insect control	3	10	Propane, iso-Butane, Acetylene, Ethylene, Hexane	50 (J) 25 (A) 20 (B)
Carbon monoxide CO	106SH	0.1~2.0%	1	White	Dark brown	Gas manufacture blast furnace, garage, car park, tunnel, atmospheric pollution survey, prediction of underground spontaneous combustion of coal, leakage detection of coal gas, combustible gas analysis, organic syntheses	1	10	Propane (0.15%), iso-Butane (0.2%), Hexane (0.1%), Acetylene (0.3%), Ethylene (0.15%)	
	106SA	40~2,000 20~1,000 5~50	1/2 ① 4	Yellow	Dark brown		3	10	Ethylene or H ₂ (5,000), Acetylene (1/5 × CO *), SO ₂ (1/5 × CO *), NO ₂ (1/5 × CO *)	
Carbon monoxide -in the presence of Ethylene, colour intensity CO	106B	Measurement for 30~300 seconds 10~1,000	1	Pale yellow	Green to Blue	Prediction of underground spontaneous combustion of coal	3	10	H ₂ S (1,000), NO ₂ (1), H ₂ (10%)	
Carbon monoxide -in the presence of Ethylene and Nitrogen oxides, colour intensity CO	106C	Measurement for 30~300 seconds 10~1,000	1	Pale yellow	Green to Blue	Gas manufacture blast furnace, garage, car park, tunnel, atmospheric pollution survey, prediction of underground spontaneous combustion of coal, leakage detection of coal gas, combustible gas analysis, organic syntheses	2	10	H ₂ (10%), H ₂ S (1,000)	

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Gas to be measured (Synonym) Chemical Formula	Tube No.	Mea- suring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
Carbon monoxide CO Concentration chart method	100	25~ 1,000 5~300	1 3	Yellow	Dark brown	Gas manufacture blast furnace, garage, car park, tunnel, atmospheric pollution survey, combustion of coal gas	3	10	Ethylene (5,000), H ₂ (5,000), Acetylene, SO ₂ or NO ₂ (1/5 × CO *)	
Carbon monoxide CO	106SS	30~500	1	Yellow	Dark brown	Gas manufacture blast furnace, garage, car park, tunnel, atmospheric pollution survey, prediction of underground spontaneous combustion of coal, leakage detection of coal gas, combustible gas analysis, organic syntheses	1.5	10	Acetylene (1/20 × CO *), SO ₂ (1/2 × CO *), NH ₃ (100 × CO *), H ₂ S (1/2 × CO *)	50 (J) 25 (A) 20 (B)
	106S	10~250	3	Yellow	Dark brown	Gas manufacture, blast furnace, garage, car park, tunnel, atmospheric pollution survey, combustion of coal gas	2	10	Ethylene (5,000), H ₂ (5,000), C ₂ H ₂ (1/5 × CO *), SO ₂ (1/5 × CO *), NO ₂ (1/5 × CO *)	
	106SC	1~50	1	Orange	Reddish purple	Gas manufacture blast furnace, garage, car park, tunnel, atmospheric pollution survey, prediction of underground spontaneous combustion of coal, leakage detection of coal gas, combustible gas analysis, organic syntheses	2	10	Formic acid, SO ₂ , C ₂ H ₂ , H ₂ , H ₂ S	
Carbon tetrachloride (Tetrachloromethane) CCl ₄	147S ‡	5~60	1	White	Red	Paint manufacture, fire extinguishers waxes, polishes	1	2 × 5	Phosgene, Halogens, Cl ₂ , Trichloroethylene, Halogenated hydrocarbons	5 (J.A) 1 (B)
Carbonyl sulphide COS	239S	5~60	1	Pink	Yellow	Process control in chemicals mfg.	3	2 × 5	SO ₂ , CS ₂ , H ₂ S, n-Butane(0.1%)	5 (A)
Chlorine Cl ₂	109SA	1~40	1	White	Yellowish orange	Leakage detection in electrolytic soda plant, leakage	2	10	Br ₂ (1), Cl ₂ O (1), NO ₂ (1/2 × Cl ₂ *)	0.5* (J) 0.1(A) — (B)
	109SB	0.5~ 10.0 0.125~ 2.5 0.1~2.0	① 4 5	White	Pale orange	detection & concentration control in synthetic rubber & plastics industry, refinery of titanium & aluminum, chlorinated hydrocarbons,	2	10	Br ₂ (1), ClO ₂ (1), NO ₂ (1/5 × Cl ₂ *), NCl ₃ (5)	
	109U	0.1~2 0.05~1	① 2	White	Pale purple	synthetic chemistry, industrial hygiene	2	10	HCl (20 × Cl ₂ *), NO ₂	
Chlorine dioxide ClO ₂ Concentration chart method	116	1~20	1	White	Reddish orange	Leakage defection in textile & paper bleaching plant, water treatment	2	10	Br ₂ , Cl ₂ or NO ₂ (1)	0.1 (A) 0.1 (B)
Chlorobenzene C ₆ H ₅ Cl	178SB	5~140 1~5	① 5	White	Pale brown	Industrial hygiene	2	2 × 5	Toluene, Xylene, CO (50), n-Hexane (100), Benzene, Ethyl benzene	10 (J.A) 1 (B)
Chloroform (Trichloromethane) CHCl ₃	152S ‡	70~500 35~250 23~167	② 3 4	White	Yellowish orange	Industrial hygiene (suspected carcinogen in humans)	2	2 × 5	Halogens, Halogenated hydrocarbons, n-Hexane (200)	3 (J) 10 (A) 2 (B)
Chloropicrin (Nitrotrichloromethane) Cl ₃ CNO ₂	172S ‡	0.1~ 16.0 0.05~ 8.0	① 2	White	Pink	Industrial hygiene	1	2 × 5	Carbon tetrachloride, Phosgene	0.1 (J.A)
Chloroprene (2-Chlorobutadiene) CH ₂ =CClCH=CH ₂	169S	1.0~20 0.5~10	1 ②	Greenish yellow	Pink	Industrial hygiene	3	2 × 5	Cl ₂ , HCl (2,000), Vinyl chloride, Acetylene, Ethylene	1 (A)
m-Chlorotoluene C ₆ H ₄ Cl(CH ₃)	132SC©	0.5~10	2	Yellowish green	Pink		3	2 × 5	HCl(500), Acetylene(4%), Ethylene(400), Cl ₂ (50)	-

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LIST OF KITAGAWA PRECISION GAS DETECTOR TUBES

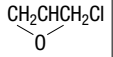
Gas to be measured (Synonym) Chemical Formula	Tube No.	Measuring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
o-Chlorotoluene <chem>C6H4CH3</chem>	132SC©	1~50	2	Yellowish green	Pink		3	2 × 5	HCl(500), Acetylene(4%), Ethylene(400), Cl ₂ (50)	(50) (A)
p-Chlorotoluene <chem>C6H4CH3</chem>	132SC©	1~50	2	Yellowish green	Pink		2	2 × 5	HCl(500), Acetylene(4%), Ethylene(400), Cl ₂ (50)	-
Cresol <chem>C6H4(CH3)OH</chem>	183U	0.5~25.0	2	Pale yellow	Pale brown	Industrial hygiene	2	10	NH ₃ (200), Aliphatic amines (50), Aromatic hydrocarbons (50), Phenols (2.5)	5 (J) 20mg/m ³ (A)
Crotonaldehyde <chem>CH3CH=CHCHO</chem>	190U©	2~40	3	Yellow	Pale blue	Compound materials	2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	C0.3 (A)
Cumene (Isopropylbenzene) <chem>C6H5CH(CH3)2</chem>	111U©	20~140	1	Yellow	Brown	Organic synthesis intermediate, fuel	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	(50) (A) 25 (B)
Cyclohexane <chem>C6H12</chem>	115S	0.01~0.6%	1	Orange	Dark green	Fire hazard detection in paints industry & painting, extraction process of oils, fats, waxes	3	10	Paraffin hydrocarbons, Acetylene, Ethylene, Benzene (400), Toluene (800), Xylene (2,000)	150 (J) 100 (A.B)
Cyclohexanol <chem>C6H11OH</chem>	206U	5~500	2	Yellow	Pale blue	Process control in synthetic rubber industry	2	10	Other alcohols	25 (J) 50 (A.B)
Cyclohexanone <chem>C6H10O</chem>	197U	2~100	3	Yellow	Pale blue	Organic solvent treating, Industrial hygiene	3	10	Alcohols	25 (J) 20 (A) 10 (B)
Cyclohexene <chem>C6H10</chem>	111U©	20~300	1	Yellow	Brown	Medicament, synthetic intermediate	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	300 (A)
Cyclohexyl amine <chem>C6H11NH2</chem>	105SD©	1~20	1	Pale purple	Pale yellow	Organic synthesis, plasticizer, rubber processing, corrosion inhibitor, dyes, dry-clean detergent, mfg. emulsifying agent	3	10	Amines	10 (A.B)
Decahydronaphthalene <chem>C10H18</chem>	111U©	20~200	1	Yellow	Brown	Solvent, adstergent, wax for floor	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	
n-Decane <chem>CH3(CH2)8CH3</chem>	111U©	5~90	1	Yellow	Brown	Organic synthesis intermediate, solvent, abstergent	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	
Diacetone alcohol (4-Hydroxy-4-methyl-2-pentanone) <chem>(CH3)2C(OH)CH2COCH3</chem>	190U©	10~250	3	Yellow	Pale blue	Fire hazard detection in paints Industry, industrial hygiene	2	10	Alcohols, Halogenated hydrocarbons, Paraffin hydrocarbons, Aromatic hydrocarbons, Esters	50 (A.B)
Diborane <chem>B2H6</chem>	242S	0.1~5.0 0.05~2.5 0.02~1.0	① 2 5	Pale yellow	Reddish purple	Industrial hygiene, semiconductor mfg. process	2	10	Arsine, Phosphine, Silane, Disilane	0.01 (J) 0.1 (A)
Dibromomethane <chem>CH2Br2</chem>	157SB© ‡	2.5~40	1	White	Yellow		3	2 × 5		
Di-n-Butyl amine <chem>(C4H9)2NH</chem>	105SD©	2~20	1	Pale purple	Pale yellow	Mfg. dye	3	10	Amines	
o-Dichlorobenzene <chem>C6H4Cl2</chem>	214S	5~100	1	White	Yellow	Solvent insecticide, industrial hygiene	2	10	Alcohols, Praffin hydrocarbons, Halogenated hydrocarbons, Esters, Aromatic hydrocarbons	25 (J.A.B)
p-Dichlorobenzene <chem>C6H4Cl2</chem>	215S ‡	10~150	1	Pale orange	Purplish blue		1	10	Benzene, Toluene, Hexane	10 (J.A) 2 (B)
1,1-Dichloroethane (Ethylidene chloride) <chem>CH3CHCl2</chem>	235SA ‡	10~160	1	White	Purple		1	3 × 5	Nitrogen oxides, Halogens, Halogenated hydrocarbons, Hexane (20), Alcohols (400), Toluene (20)	100 (J.A.B)
1,2-Dichloroethane (Ethylidene dichloride) <chem>ClCH2CH2Cl</chem>	230SA ‡	11~110 5~50 2.5~25 1~10	1/2 ① 2 5	White	Purple	Industrial hygiene	1	3 × 5	Nitrogen oxides, Halogens, Halogenated hydrocarbons, Hexane (100)	10 (J.A) 5 (B)

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				Original	Stain					
2,2'-Dichloroethyl ether (ClCH ₂ CH ₂) ₂ O	223S	2~30	1	Greenish yellow	Pink		1	2 × 5	Halogenated hydrocarbons	15 (J) 5 (A)
1,1-Dichloroethylene CH ₂ =CCl ₂	132SC	1~22	1	Yellowish green	Pink		3	2 × 5	HCl(500), Acetylene(4%), Ethylene(400), Cl ₂ (50)	5 (A)
1,2-Dichloroethylene (Acetylene dichloride) ClCH=CHCl	145SA ‡	42~840 20~400 9.2~184 4.2~84	1/2 ① 2 4	Yellow	Red	Extraction of natural dyes, mfg. perfumes, paints industry & painting, ferment retardation, industrial hygiene	1	10	Vinyl chloride, Hydrogen chloride, Trichloroethylene, Cl ₂	150 (J) 200 (A.B)
Dichloromethane (Methylene chloride) CH ₂ Cl ₂	180S ‡	30~ 1,000 10~200	② 4	White	Reddish orange		2	2 × 5	Halogens, Halogenated hydrocarbons	50 (J.A) 100 (B)
1,2-Dichloropropane CH ₃ CHClCH ₂ Cl	157SB ‡	20~250	1	White	yellow	Industrial hygiene	3	2 × 5		1 (J) 10 (A)
1,3-Dichloropropane ClCH ₂ CH ₂ CH ₂ Cl	194S ‡	10~500	1	White	Orange		1	2 × 5	Halogenated hydrocarbons	
1,3-Dichloropropene ClCH ₂ CH=CHCl	249S	0.5~10	1	Yellowish green	Pink	Fumigation in soil by the name of D-D	3	2 × 5	Chloropicrin (1,800), MITC (600)	1 (A)
Dicyclopentadiene C ₁₀ H ₁₂	190U	2~60	3	Yellow	Pale blue	Mfg. EP rubber, unsaturated polyester resins, coating materials and perfume	2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	0.5 (A) 5 (B)
Diesel fuel	251U	0.5-12.5 1~30	4 ②	White	Pale brown +Pale green (at the top)	To monitor residual and leakage of tank	2	10	Propane, Isobutane, Hexane, Octane, Gasoline,	100mg/ m ³ (A)
Diethyl amine (C ₂ H ₅) ₂ NH	222S	1~20	1	Pale purple	Pale yellow	Industrial hygiene	3	10	NH ₃ , Other amines	10 (J) 5 (A.B)
Diethylbenzene C ₆ H ₄ (C ₂ H ₅) ₂	111U	10~180	1	Yellow	Brown	Organic synthesis intermediate, solvent, abstergent	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	
Diisobutyl ketone [(CH ₃) ₂ CHCH ₂] ₂ CO	139U	20~ 1,000	1	Yellow	Pale blue		2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons, Halogenated hydrocarbons, Paraffin hydrocarbons	25 (A)
Di-iso-Propyl amine [(CH ₃) ₂ CH] ₂ NH	105SD	1~16	1	Pale purple	Pale yellow	Dyestuffs, surfactant, herbicide	3	10	Amines	5 (A.B)
N,N-Dimethylacetamide CH ₃ CON(CH ₃) ₂	229S	5~70	2	Pale purple	Pale yellow	Solvents for chemical reaction, refinery and resins paint remover	1	10	CO ₂ , NH ₃ , Amines, Hydrazine	10 (J.A.B)
Dimethyl amine (CH ₃) ₂ NH	227S	1~20	1	Pale purple	Pale yellow	Industrial hygiene	3	10	NH ₃ , Other amines	2 (J) 5 (A) 2 (B)
N,N-Dimethyl aniline C ₆ H ₅ N(CH ₃) ₂	105SD	0.5~9	1	Pale purple	Pale yellow	Mfg. vanillin, dye	3	10	Amines	5 (J.A.B)
Dimethyl ether (Methyl ether) CH ₃ OCH ₃	123S	0.01~ 1.2%	1	Orange	Dark brown	Impurity test of Methyl chloride, process control, refrigeration	3	10	Acetylene (3%), Propane (0.2%), Other organic gases or vapours except Halogenated hydrocarbons	400 (B)
N,N-Dimethyl formamide (CH ₃) ₂ NCHO	196S	2~30 1~15	① 2	Pale purple	Pale yellow	Stationary phase of chromatography	2	10	SO ₂ (200), CO ₂ (0.1%), NH ₃ , Amines, Hydrazine	10 (J) 5 (A) 5 (B)
Dimethyl sulphide (CH ₃) ₂ S	250S	0.21-7.9 1~40 2.1-100	4 ① 1/2	Purple	Pale yellow	Odorant for LPG, food flavour for coffee, chocolate, cocoa, synthetic intermediate/ essential oil, etc.	3	10	Mercaptans, Butane	10 (A)

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				Original	Stain					
1,4-Dioxane $C_4H_8O_2$	139SB©	0.05~ 2.5%	2	Orange	Brownish green	Fire hazard detection in paints & painting industry, industrial hygiene	3	10	Acetylene (3%), Propane (0.2%), Other organic gases or vapours except Halogenated hydrocarbons (50)	1 (J) 20 (A.B)
	119U©	20~500	1	Yellow	Pale blue		2	10	Alcohols, Toluene (500)	
Di-n-Propyl amine $[CH_3(CH_2)_2]_2NH$	105SD©	1~14	1	Pale purple	Pale yellow	Synthesis intermediate	3	10	Amines	
Divinyl benzene $C_6H_4(CHCH_2)_2$	158S©	5~50	1	White	Yellow	Ion exchange resin and membrane, synthetic rubber, etc.	3	10	Methanol (0.35%), Ethanol (0.18%), Ethyl acetate (700), Butyl acetate (700), Butadiene (5), Formaldehyde (15), Acetaldehyde (350), Acrylonitrile (400)	10 (A)
Epichlorohydrine (1-Chloro-2,3-epoxypropane) CH_2CHCH_2Cl 	192S	5~50	3	Greenish yellow	Pink	Mfg. epoxy resin, Chlorinated rubber, glycerin	1	2 × 5	Halogenated hydrocarbons	0.5 (A.B)
Ethyl acetate $CH_3CO_2C_2H_5$	111SA	0.1~ 5.0%	1	Orange	Brownish green	Fire hazard detection in paints industry & painting, mfg. artificial leather artificial silk, perfumes & flavours, photographic films & plates	3	10	Acetylene (3%), Propane (0.2%), Other organic gases or vapours except Halogenated hydrocarbons (50)	200 (J.B) 400 (A)
	111U	10~ 1,000	1	Yellow	Brown	Fire hazard detection in paints industry & painting	2	10	Other esters, Ketones, Alcohols, Aromatic hydrocarbons, Halogenated hydrocarbons	
Ethyl acrylate $CH_2=CHCO_2C_2H_5$	211U©	5~60	2	Yellow	Pale blue	Material of Acrylic resin	2	10	Alcohols, Paraffin hydrocarbons, Esters, Halogenated hydrocarbons, Aromatic hydrocarbons	5 (A.B)
Ethyl alcohol (Ethanol) C_2H_5OH	104SA	0.05~ 5.0%	1	Yellowish orange	Light green	Fire hazard detection in hospital, laboratory, pharmaceutical industry, mfg. perfumes & cosmetics	3	10	Aliphatic hydrocarbons, Alcohols, Esters, Ketones, Aromatic hydrocarbons, Halogenated hydrocarbons	STEL 1,000 (A.B)
	104U	20~1,000	1	Yellow	Brown/ pale blue	Disinfectant at hospitals/labs	2	10	Alcohols, Aliphatic hydrocarbons, Aromatic hydrocarbons, Esters, Ethers, Halogenated hydrocarbons, Ketones	
	104SB	20~300	1	Pink	White		3	2 × 5	Alcohols, 1,3-Butadiene, H ₂ S, Isobutylene, Acetone, n-Hexane, NH ₃	
Ethyl amine $C_2H_5NH_2$	227S	1~20	1	Pale purple	Pale yellow	Industrial hygiene	3	10	Ammonia, Other Amines	10 (J) 5 (A) 2 (B)
Ethyl benzene $C_6H_5C_2H_5$	179S	10~500	1	White	Brown	Industrial hygiene	1.5	10	Toluene (25), Xylene (50), Benzene (10), Methanol (1%), Hexane (0.1%)	50 (J) 20 (A) 100 (B)
Ethyl bromide C_2H_5Br	157SB© ‡	20~400 2~80	1/2 ①	White	Yellow		3	2 × 5		5 (A)
Ethyl-tert-Butyl Ether (ETBE) $C_2H_5OC(CH_3)_3$	248U	1~60	3	Pale yellow	Pale blue	Used for automobile fuel adding the ETBE in Gasoline	1	10	Ethanol	25 (A)
Ethyl cellosolve (Ethylene glycol monoethyl ether) (2-Ethoxyethanol) $C_2H_5OCH_2CH_2OH$	190U	5~500	3	Yellow		Organic solvent treating	2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	5 (J.A) 2 (B)
Ethyl cellosolve acetate (Ethylene glycol ethyl ether acetate) $CH_3COO(CH_2)_2OC_2H_5$	190U©	5~150	3	Yellow	Pale blue		2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	5 (J.A) 2 (B)

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				Original	Stain					
Ethyl ether (Diethyl ether) $C_2H_5OC_2H_5$	107SA	0.04~ 1.4%	1	Orange	Dark green	Fire hazard detection in solvent extraction process, hospital, laboratory, organic syntheses, clinical laboratories, explosive mfg.	3	10	Acetylene (3%), Propane (0.2%), Other organic gases or vapours except Halogenated hydrocarbons (50)	400 (J.A) 100 (B)
	107U	20~400	1	Pale yellow	Pale blue		2	10	Alcohols, Ketones, Esters, Aromatic hydrocarbons	
Ethyl mercaptan (Ethanethiol) C_2H_5SH	165SA	4~160 2~80 1~40	1 ② 4	White	Yellow	Atmospheric pollution survey, concentration control of odorant, plastics manufactures	2	10	Methyl sulphide (1), NO ₂ (1), Cl ₂ (0.2)	0.5 (A.B)
	165SB	5~80 2.5~40	1/2 1	Yellow	Pink	Odorant for LP gas	2	10	H ₂ S, PH ₃ , Arsine, Hydrogen selenide, HCN, NO ₂ , NH ₃ , SO ₂ , Other Amines	
	130U	1.05~10.5 0.525~5.25 0.105~1.05	1/2 1 5	Pale yellow	Pink	Industrial hygiene	2	10	Arsine, Hydrogen selenide, H ₂ S, HCN, PH ₃	
Ethyl methacrylate $CH_2=C(CH_3)COOC_2H_5$	111U©	20~500	1	Yellow	Brown	Organic synthesis intermediate; mfg. synthetic resin, lubricant additive, rust-proof for metal, paper coating agent	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	
Ethylene -colour intensity $H_2C=CH_2$	108B	0.5~100 0.1~20	① 5	Pale yellow	Blue	Coal mining safety, concentration control in fruits ripening, organics, mfg. plastics	3	10	CO, NO ₂ (1), Cl ₂ , Butane, Pentane, Acetylene, H ₂ S (1,000), HCN, CS ₂ , NH ₃ , H ₂ (10%)	200 (A)
Ethylene $H_2C=CH_2$	108SA	20~ 1,200	1	Yellow	Blue		2	10	CO, H ₂ S, Acetylene, Propylene	
	108SC	1~200	4	Yellow	Blue	Used for fruits ripening control	2	2 × 5	Acetylene, CO, Propylene, H ₂ S	
Ethylene dibromide (1, 2-Dibromoethane) $BrCH_2CH_2Br$	166S ‡	1~50	1	White	Yellow	Concentration control in granary fumigation process	1	2 × 5	Halogens or Halogenated hydrocarbons, Hexane (200)	– (A) 0.5 (B)
Ethylene glycol (Monoethylene glycol) $HOCH_2CH_2OH$	232SA	20~250 mg/m ³	2	Pink	Yellow	Industrial hygiene	1.5	2 × 5	Ethylene oxide, SO ₂ , Aldehydes, H ₂ S	25 (A)
	232SB	3~40 mg/m ³	3	Pale pink	Yellow		2	2 × 5	Aldehydes, SO ₂ , H ₂ S	
Ethylene oxide CH_2CH_2O	122SA	1.0~ 4.0% 0.01~ 1.8%	1/2 ①	Orange	Dark brown	Concentration control in fumigation of foodstuffs & textiles, fire hazard detection in ethylene glycol plant, sterilization	3	10	Alcohols, Ketones, Aromatic hydrocarbons, Esters, Halogenated hydrocarbons (0.5%)	1 (J.A.B)
	122SL	130~ 2,600 50~ 1,000	1/2 ①	Yellow	Pale blue		3	10	Alcohols, Esters, Ethers, Ketones, Aromatic hydrocarbons, Aliphatic hydrocarbons(over C ₃), Halogenated hydrocarbons	
	122SM	5~100	3	Yellow	Pale blue		3	10	Alcohols, Esters, Aromatic hydrocarbons	
	122SC	1~15	3	Pale pink	Yellow	Concentration control in fumigation & textiles	2	2 × 5	Aldehydes, SO ₂ , H ₂ S	
	122SD ‡	0.7~ 14.0 0.1~2.0	1 ④	Yellow	Pale pink	Atmospheric pollution surveys in hospitals	1	2 × 5	Formaldehyde (0.5)	
	171SA ‡	20~ 1,500	1	Yellow	Pink	Atmospheric pollution survey, germicide, fungicide organic mfg. industrial hygiene	2	2 × 5	Other aldehydes	
Formaldehyde $HCHO$	171SB	1~35	3	White	Brownish orange		3	2 × 5	Other aldehydes (1), Styrene, Ether (1,000), Ethyl acetate (1,000), Trichloroethylene (500)	0.1(J.A) 2 (B)
	171SC ‡	0.1~4.0 0.05~ 2.0	⑤ 10	Yellowish orange	Pink		1	10	Acetaldehyde, NH ₃ (10), NO ₂ (3)	
Formic acid $HCOOH$	216S	1~50	1	Pale pink	Yellow	Mfg. organic medicine, industrial hygiene	3	10	SO ₂ (1/20 × HCOOH), NO ₂ (10), HCl (2 × HCOOH), Cl ₂ (5), Acetic acid	5 (J.A.B)

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LIST OF KITAGAWA PRECISION GAS DETECTOR TUBES

Gas to be measured (Synonym) Chemical Formula	Tube No.	Measuring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
Furan (Furfuran) C ₄ H ₄ O	122SA◎	0.2~2.0% 0.01~0.9%	1/2 1	Orange	Dark brown	Fire hazard detection in paints industry & painting	3	10	Aromatic hydrocarbons, Esters, Ketones, Alcohols, Halogenated hydrocarbons	
Furfural (2-Furaldehyde) C ₅ H ₄ O ₂	190U◎	2~60	3	Yellow	Pale blue	Materials of Nylon 66, insecticide	2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	2.5 (J) 0.2 (A) 2 (B)
Furfuryl alcohol C ₄ H ₃ OCH ₂ OH	238S	5~25	5	White	Black	Material of furan resin, resin denaturant, solvent, industrial hygiene	1	10		5 (J) 0.2 (A)
Gasoline (Petrol) C _n H _m	110S	0.05~0.6% 0.01~0.12%	① 4	Orange	Dark green	Process control, industrial hygiene	3	10	Paraffin hydrocarbons, Acetylene, Ethylene, Cyclohexane, Benzene (400) Toluene (800), Xylene (2,000)	100 (J) 300 (A)
General hydrocarbons iso-C ₄ H ₁₀ , n-C ₅ H ₁₂ , n-C ₈ H ₁₈ , n-C ₆ H ₁₄ Mineral turpentine	187S	50~1,400	1	Orange	Yellowish green		2	10	Aromatic hydrocarbons	
Heptane CH ₃ (CH ₂) ₅ CH ₃	113SB◎	100~2,000	1	Orange	Yellowish green	Industrial hygiene	2	10	Paraffin hydrocarbons, Aromatic hydrocarbons, Alcohols (6%), Ketones (6%), Esters (6%)	200 (J) 400 (A) 500 (B)
n-Hexane CH ₃ (CH ₂) ₄ CH ₃	113SA	0.11~1.32% 0.05~0.6%	1/2 ①	Orange	Dark green	Solvent recovery control & fire hazard detection in extraction of oils & fats, paints industry & painting	3	10	Paraffin hydrocarbons, Acetylene, Ethylene, Cyclohexane, Benzene (400) Toluene (800), Xylene (2,000)	40 (J) 50 (A) 20 (B)
	113SB	50~1,400	1	Orange	Yellowish green		2	10	Paraffin hydrocarbons, Aromatic hydrocarbons	
	113SC	16~800 4~200	1 ③	Yellow	Pale blue		2	10	Toluene	
Hydrazine (Amidrazone) N ₂ H ₄	219S	0.2~10.0 0.1~5.0 0.05~2.5	2 ④ 8	Yellow	Blue	Rocket fuel, corrosion protection of boiler, antioxidant	2	10	NH ₃ , Amines	0.1 (J) 0.01 (A.B)
Hydrogen H ₂	137U	0.05~0.8%	1/2	Yellow	Blue/ Yellowish green	Industrial hygiene	3	5	Ethanol (0.4%), CO (500)	
Hydrogen chloride HCl	173SA	40~1,200 20~600	1/2 ①	Purple	Pink	Industrial hygiene, process control, leakage detection, fire hazard detection, pharmaceuticals organics mfg.	2	2 × 5	SO ₂ , Cl ₂	2* (J) C2 (A) 1 (B)
	173SB	4~40 2~20 0.4~4	1/2 ① 5	Yellowish green	Pink		3	2 × 5	Cl ₂	
Hydrogen cyanide HCN	112SA	0.01~3.0%	1	Yellow	Brownish red	Concentration control in fumigation process	3	10	Acetone, CS ₂ , SO ₂ (200), H ₂ S (100), Dicyanide	5 (J) C4.7 (A) 0.9 (B)
	112SB ‡	4.6~230 2~100 0.5~25	1/2 ① 4	Yellow	Red	Electro-plating, metal hardening fumigation process, industrial hygiene	2	10	SO ₂ (1), H ₂ S (3), NH ₃ (5)	
	112SC ‡	0.3~8	3	Yellow	Red		1	2 × 5	SO ₂ (1), PH ₃ , H ₂ S, NH ₃ (2)	
Hydrogen fluoride HF	156S	0.5~30 0.25~15 0.17~2	③ 6 9	Yellowish green	Pink	Dehydrator, mfg. of Hydrofluoric acid, and Freon, industrial hygiene	3	10	Cl ₂ , HCl	3* (J) 0.5 (A) 1.8 (B)
Hydrogen peroxide H ₂ O ₂	247S ‡	0.5~10.0	5	White	Yellow	Mfg. bleach, industrial chemicals and medicine	1	10	HCHO (10)	1 (A.B)
Hydrogen selenide H ₂ Se	167S	5~600 1~120	① 5	Pale yellow	Dark brown	Doping gas analysis in mfg. semiconductor, industrial hygiene	1	10	Arsine (10), H ₂ S, Iron carbonyl (10), SO ₂ , Hg ₂ , Acetylene (3%), CO (0.1%), Nickel carbonyl (10)	0.05 (J.A) 0.02 (B)
	242S◎	1~20 0.5~10	① 2	Pale yellow	Reddish purple		2	10		

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				Original	Stain					
Hydrogen sulphide -ultra high range H ₂ S	120UT	5~40% 2.5~5%	(1/2) 1	Pale blue	Black	Oil field (esp. oil well)	3	5	SO ₂ (8%)	
	120UH	2~20%	1/2	Light blue	Black		3	10	SO ₂	
Hydrogen sulphide H ₂ S	120SH	0.1~ 4.0%	1	Pale blue	Black	Process control in sulphur recovery plant in petroleum refinery	3	10	SO ₂ (0.5%)	5(J.B) 1 (A)
	120SM	0.1~ 1.2% 0.05~ 0.6%	1/2 ①	White	Dark brown		2	10	SO ₂ (0.3%)	
	120SF	100~ 2,000 50~ 1,000 25~500	1/2 ① 2	White	Black	Impurity test of industrial raw gases, chemicals mfg., metallurgy	3	10	SO ₂ (5,000), Mercaptans	
	120SC	50~ 1,600	1	Pale yellow	Dark blue	Process control in sulphur recovery plant in petroleum refinery	3	10	CO (10), Ethylene, Propylene, Butylene, Acetylene or Methyl mercaptan (5), HCN, NH ₃	
	120SB	6~300 3~150 1~50 0.75~ 37.5	1/2 ① 3 4	White	Dark brown	Mfg. viscose rayon, oil refinery, metal refinery, gasmanufacture, chemical laboratory, process control	3	10	SO ₂ (12), Mercaptans (550), NO ₂ (2)	
	120SD	2~60 1~30	1/2 ①	White	Pale brown	Process control in sulphur recovery plant in petroleum refinery	3	10	SO ₂ (10), Mercaptans (300), NO ₂ (2)	
	120SE	2~40 1~20 0.5~10	1/2 ① 2	Yellow	Pink		2	10	PH ₃ , Mercaptans, NH ₃ , NO ₂	
	120U	0.2~6.0 0.1~3.0	1/2 ①	Pale yellow	Pink	Industrial hygiene	2	10	Arsine, Hydrogen selenide, Mercaptans, PH ₃ , HCN, SO ₂	
Hydrogen sulphide- Mercaptans -separation measurement H ₂ S & R-SH	282S	H ₂ S; 1~30	1	White	Pale brown		2	2 × 5	Tube for H ₂ S; SO ₂ (1/3 × H ₂ S *), NO ₂ (1/5 × H ₂ S *)	5 (J.B) 1(A)
		R-SH; 0.5~5.5		Pale yellow	Pink				Tube for R-SH; NO ₂ (1), NH ₃ (1), H ₂ S (30)	
Iodine I ₂	117SB©	0.7~42	1	White	Yellow	Catalyst in the industrial production	1	10	Cl ₂ , Br ₂ , NO(15)	0.01(A) -(B)
Isobutane (CH ₃) ₃ CH	113SB©	50~ 1,200	1	Orange	Yellowish green	Industrial hygiene	2	10	Alcohols, Ketones or Esters (60%), Aromatic hydrocarbons, Paraffin hydrocarbons	500 (J) STEL 1,000 (A)
Isobutyl acetate CH ₃ CO ₂ CH ₂ CH(CH ₃) ₂	139SB©	0.01~ 1.4%	2	Orange	Brownish green	Fire hazard detection in paints industry & painting, mfg. artificial leather, textile sizing compounds, printing inks	3	10	Acetylene (3%), Propane (0.2%), Other organic gases or vapours except Halogenated hydrocarbons (50)	50 (A) 150 (B)
	153U	10~400	1	Pale yellow	Pale blue	Industrial hygiene	1	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	
Isobutyl acrylate CH ₂ =CHCO ₂ CH ₂ CH(CH ₃) ₂	211U©	5~60	2	Yellow	Pale blue	Industrial hygiene	2	10	Alcohols, Paraffin hydrocarbons, Esters, Halogenated hydrocarbons, Aromatic hydrocarbons	
Isobutyl alcohol (Isobutanol) (CH ₃) ₂ CHCH ₂ OH	208U	5~100	3	Yellow	Pale blue	Detergent of paint and varnish, mfg. Esters for fruit essence, industrial hygiene	2	10	Alcohols, Toluene	50 (J.A.B)
Isobutylene (CH ₃) ₂ C=CH ₂	113SB©	0.03~ 2.0%	1	Orange	Yellowish green	Mfg. Butyl-rubber	2	10	Paraffin, Aromatic hydrocarbons, Alcohols (6%), Ketones (6%), Esters (6%)	250 (A)

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Gas to be measured (Synonym) Chemical Formula	Tube No.	Measuring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
Isobutyric acid (CH ₃) ₂ CHCOOH	216S©	3~50	1	Pale pink	Yellow	Disinfectant, artificial flavour, substrate for perfume, tan processing	3	10	SO ₂ (1/20 × Acetic acid *), NO ₂ (10), HCL (2 × Acetic acid *), Cl ₂ (5)	
Isopentyl acetate (Isoamyl acetate) CH ₃ CO ₂ CH ₂ CH ₂ CH(CH ₃) ₂	188U	10~400	1	Pale yellow	Pale blue	Industrial hygiene	1	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	50 (J) 50 (A)
Isopentyl alcohol (Isoamyl alcohol) (CH ₃) ₂ CHCH ₂ CH ₂ OH	209U	5~100	3	Yellow	Pale blue	Stabilizer for Sodium thiosulphate hypo, industrial hygiene	2	10	Alcohols, Toluene	100 (J.A.B)
Isophorone C ₉ H ₁₄ O	197U©	5~80	3	Yellow	Pale blue	Solvent, ink, paint, lacquer, adhesive, copolymer, lag, finish and biocide	3	10	Alcohols	C5 (A)
Isoprene CH ₂ =C(CH ₃)CH=CH ₂	190U©	1~16	3	Yellow	Pale blue	Industrial hygiene	2	10	Alcohols, Esters, Aliphatic hydrocarbons (over C ₃), Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	3 (J)
Isopropyl acetate CH ₃ CO ₂ CH(CH ₃) ₂	139SB©	0.01~1.2%	2	Orange	Brownish green	Fire hazard detection in paints industry & painting, mfg. artificial leather, plastic films, adhesives, recovery of acetic acid, industrial hygiene	3	10	Acetylene (3%), Propane (0.2%), Other organic gases or vapours except Halogenated hydrocarbons (50)	100 (J.A) - (B)
	111U	10~1,000	1	Yellow	Brown	Fire hazard detection in paints industry & painting	2	10	Other Esters, Ketones, Alcohols, Aromatic hydrocarbons, Paraffin hydrocarbons	
Isopropyl alcohol (2-Propanol) CH ₃ CH(OH)CH ₃	122SA©	0.05~2.5%	1	Orange	Dark brown	Fire hazard detection in paints industry & painting, mfg. pharmaceuticals, cosmetics, perfumes, inks, leather dyes, antifreezes, hydraulic brake fluids, metal decreasing & drying, hospitals, laboratories	3	10	Other Alcohols, Ketones, Esters, Aromatic hydrocarbons, Halogenated hydrocarbons (0.5%)	400* (J) 200 (A) 400 (B)
	150U	50~1,200 20~480	① 2	Yellow	Pale blue	Industrial hygiene	2	10	Other Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	
	104SB©	20~300	1	Pink	White/pale pink		3	2 × 5	Alcohols, 1,3-Butadiene, H ₂ S, Isobutylene, Acetone, n-Hexane, NH ₃	
Isopropylamine (CH ₃) ₂ CHNH ₂	222S©	1~12	1	Pale purple	Pale yellow		3	10		2 (A)
Isopropyl cellosolve (CH ₃) ₂ CHOCH ₂ CH ₂ COH	190U©	5~350	3	Yellow	Pale blue		2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	25 (A)
Isopropyl ether (CH ₃) ₂ CHOCH(CH ₃) ₂	111U©	30~800	1	Yellow	Brown	Gunpowder, blast, dyestuff, solvent, abstergent, mfg. rubber cement, lens	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	250(A.B)
Isopropyl mercaptan (CH ₃) ₂ CHSH	130U	1.15~11.5 0.575~5.75 0.115~1.15	1/2 1 5	Pale Yellow	Pink		2	10	Arsine, Hydrogen selenide, H ₂ S, HCN, PH ₃	
Isovaleric acid (CH ₃) ₂ CHCH ₂ COOH	216S©	3~50	1	Pale pink	Yellow	Artificial flavour, perfume and medical uses	3	10	SO ₂ (1/20 × Acetic acid *), NO ₂ (10), HCL (2 × Acetic acid *), Cl ₂ (5)	
Maleic anhydride C ₄ H ₂ O ₃	216S	0.2~10	4	Pale pink	Yellow	Material of polyester resin	3	10	SO ₂ (1/20 × Acetic acid *), NO ₂ (10), HCL (2 × Acetic acid *), Cl ₂ (5)	0.1 (J) 0.01 mg/m ³ (A) 1mg/m ³ (B)

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				Original	Stain					
Mercury vapour Hg	142S	0.5~10 mg/m ³ 0.1~2.0 mg/m ³	1 ⑤	Grey	Pale orange	Electrolytic soda industry, mfg. thermometer, fluorescent lamp	3	10	HCl (0.5), NO ₂ (0.1), Cl ₂ (0.1), H ₂ S (0.5)	0.025 mg/m ³ (J.A) 0.02 mg/m ³ (B)
Mesityl oxide (4-Methyl-3-penten-2-one) CH ₃ COCH=C(CH ₃) ₂	190U©	5~100	2	Yellow	Pale blue	Industrial hygiene	2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	15 (A)
Methacrylic acid CH ₂ =C(CH ₃)COOH	216S©	1~50	1	Pale pink	Yellow	Mfg. soluble polymer	3	10	SO ₂ (1/20 × Acetic acid *) NO ₂ (10), HCL (2 × Acetic acid *), Cl ₂ (5)	2 (J) 20 (A.B)
1-Methoxy-2-propanol CH ₃ CHOHCH ₂ OCH ₃	197U©	10~500	1	Yellow	Pale blue	Solvent, ink, lacquer, cellulose, dyes, etc	3	10	Alcohols	50 (A) 100 (B)
Methyl acetate CH ₃ CO ₂ CH ₃	111SA©	0.1~ 3.0%	1	Orange	Brownish green	Fire hazard detection in paints industry & painting, mfg. perfumes, dyes, synthetic finishes	3	10	Acetylene (3%), Propane (0.2%), Other organic gases or vapours, except Halogenated hydrocarbons	200 (J.A.B)
Methyl acrylate CH ₂ =CHCO ₂ CH ₃	211U	2~60	2	Yellow	Pale blue	Material of Acrylic resin, industrial hygiene	2	10	Alcohols, Esters, Paraffin hydrocarbons (over C ₃), Aromatic hydrocarbons, Halogenated hydrocarbons	2 (J.A) 5 (B)
Methyl alcohol (Methanol) CH ₃ OH	119SA	0.05~ 6.0%	1	Yellowish orange	Light green	Fire hazard detection in hospital & laboratory, pharmaceutical industry, paints industry & painting, mfg. printing inks, denatured-alcohol, antifreezes, perfumes & cosmetics, industrial hygiene	3	10	Paraffin hydrocarbons (over C ₃), Alcohols, Esters, Aromatic hydrocarbons, Halogenated hydrocarbons	200 (J.A.B)
	119U	20~ 1,000	1	Yellow	Pale blue		2	10	Alcohols, Esters, Aromatic hydrocarbons, Paraffin hydrocarbons, Halogenated hydrocarbons	
	104SB©	20~300	1	Pink	White/ pale pink		3	2 × 5	Alcohols, 1,3-Butadiene, H ₂ S, Isobutylene, Acetone, n-Hexane, NH ₃	
Methanol in LPG	119LPG	100~ 1,000 ppmv	1/2	Yellow	Blue or Yellowish green	Antifreezing agent in LP gas	3	10		200 (J.A.B)
Methyl amine CH ₃ NH ₂	227S	1~20	1	Pale purple	Pale yellow	Industrial hygiene	3	10	NH ₃ , Other amines	5 (J.A)
Methyl amyl ketone (2-Heptanone) CH ₃ CO(CH ₂) ₄ CH ₃	139U©	25~350	3	Yellow	Pale blue		2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	50 (A.B)
N-Methyl aniline C ₆ H ₅ NHCH ₃	105SD©	0.5~6	2	Pale purple	Pale yellow	Acid acceptor, solvent	3	10	Amines	0.5 (A.B)
Methyl bromide (Bromomethane) CH ₃ Br	157SA ‡	10~500	1	White	Reddish orange	Insect fumigation for mills, warehouses, ships, vaults, freight cars, concentration control in granary fumigation	3	2 × 5	Halogens, Halogenated hydrocarbons, Trichloroethylene (20), Tetrachloroethylene (40)	1 (J.A) 5 (B)
	157SB ‡	2~80 1~25 0.4~10	① 2 4	White	Yellow		3	2 × 5	Halogens, Halogenated hydrocarbons, Hexane (200)	
	157SD	8.8~22 0.5~10 0.1~0.5	1/2 ① 3	White	Purple		1	2 × 5		
	157JS	3~70 g/m ³	1/2	Yellow	Brown		2	2 × 10		

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				Original	Stain					
Methyl butyl ketone $\text{CH}_3(\text{CH}_2)_3\text{COCH}_3$	237S©	5~80	2	Yellow	Pale blue		2	10		5 (J.A.B)
Methyl cellosolve (Ethylene glycol monomethyl ether) (2-Methoxyethanol) $\text{CH}_3\text{OCH}_2\text{CH}_2\text{OH}$	190U	5~500	3	Yellow	Pale blue	Organic solvent treating	2	10	Paraffin hydrocarbons (over C_3), Alcohols, Ketones, Aromatic hydrocarbons, Halogenated hydrocarbons, Esters	0.1 (J.A) 1 (B)
Methyl cellosolve acetate $\text{CH}_3\text{CO}_2\text{CH}_2\text{CH}_2\text{OCH}_3$	190U©	3~120	3	Yellow	Pale blue		2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	0.1 (J.A) 1 (B)
Methyl cyclohexane $\text{C}_6\text{H}_{11}\text{CH}_3$	113SB©	100~ 1,600	1	Orange	Yellowish green	Cellulose solvent	2	10	Paraffin, Aromatic hydrocarbons, Alcohols (6%), Ketones (6%), Esters (6%)	400 (J.A)
Methyl cyclohexanol $\text{CH}_3\text{C}_6\text{H}_{10}\text{OH}$	199U	5~200	3	Yellow	Pale blue	Mfg. lubricating oil & liquer, industrial hygiene	2	10	Alcohols	50 (J.A.B)
Methyl cyclohexanone $\text{CH}_3\text{C}_6\text{H}_9\text{O}$	198U	2~100	3	Yellow	Pale blue	Industrial hygiene	2	10	Alcohols	50 (J.B) 20 (A)
Methyl ethyl ketone (2-Butanone) $\text{CH}_3\text{COC}_2\text{H}_5$	122SA©	1.0~ 5.0% 0.05~ 2.2%	1/2 ①	Orange	Dark brown	Process control, synthetic resins, solvent; solvent recovery control & fire hazard detection in paint industry & extraction of oils, fats, natural resins, waxes; cleaning & decreasing of metal surface, denaturization of alcohol	3	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons, Halogenated hydrocarbons (0.5%)	200 (J.A.B)
	139SB	0.01~ 1.4%	2	Orange	Brownish green		3	10	Other organic gases or vapours except Halogenated hydrocarbons (50), Acetylene (3%), Propane (0.2%)	
	139U	20~ 1,500	1	Yellow	Pale blue	Process control, fire hazard detection in paints industry, esp. industrial hygiene	2	10	Other Esters, Ketones, Alcohols, Aromatic hydrocarbons, Halogenated hydrocarbons, Paraffin hydrocarbons	
Methyl iodide (Iodomethane) CH_3I	176UH	500~ 15,000	1/2	Yellowish orange	Brownish green	Wood fumigation	3	10		2 (A.B)
	176SC ‡	2.5~50 1~20 0.4~8	1/2 ① 2	White	Gray		1	10	1, 3-Dichloropropene, Hydrogen sulphide, Toluene	
Methyl isobutyl ketone (Isopropyl acetone) $(\text{CH}_3)_2\text{CHCH}_2\text{COCH}_3$	122SA©	0.01~ 0.6%	3	Orange	Dark brown	Solvent forgums, resins, nitrocellulose	3	10	Alcohols, Other Ketones, Aromatic hydrocarbons, Esters, Halogenated hydrocarbons	50 (J.B) 20 (A)
	155U	5~300	1	Yellow	Pale blue	Industrial hygiene	2	10	Alcohols, Esters, Aliphatic hydrocarbons (over C_3), Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	
Methyl isothiocyanate (MITC) CH_3NCS	245UH	200~ 10,000	1	Yellowish orange	Pale green	Wood fumigation	3	10		
	245UM	25~1,500 10~600	1/2 ①	Pale yellow	Pale blue		1	10		
	245UL ‡	0.66~22 0.3~10	1/2 ①	Pink	Yellowish orange	Soil fumigation	1	2 × 5	Carbon dioxide	
Methyl mercaptan (Methanethiol) CH_3SH	164SH	50~ 1,000	1	Pale yellow	Orange	Pesticides, fungicides, plastics, atmospheric pollution survey, concentration control of odorant	3	10	H_2S (650), NO_2 (1,000), Cl_2 (1/3 × CH_3SH *)	0.5 (A.B)
	164SA	5~140	1	White	Reddish yellow		2	10	Cl_2 (0.2), Methyl sulphide (1), Ethyl mercaptan, Acetylene, CO , Acetylene, H_2S	
	130U	1~10 0.5~5 0.1~1	1/2 ① 5	Pale yellow	Pink		2	10	Arsine, Hydrogen selenide, H_2S , HCN , PH_3	
Methyl methacrylate $\text{CH}_2=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_3$	184S	10~160	1	Yellow	Pale blue	Pigment, adhesive, paintings	2	10	Esters, Ketones, Alcohols, Aromatic hydrocarbons	8.3mg/m ₃ (J) 50 (A.B)

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Gas to be measured (Synonym) Chemical Formula	Tube No.	Mea- suring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
Methyl propyl ketone CH ₃ CO(CH ₂) ₂ CH ₃	139U	20~ 1,500	1	Yellow	Pale blue	Industrial hygiene	2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons, Halogenated hydrocarbons, Paraffin hydrocarbons	ST150(A) 200 (B)
Methyl styrene CH ₃ C ₆ H ₄ CH=CH ₂	193S	10~500	1	White	Yellow	Synthetic resin	3	10	Styrene	50 (A)
Monoethanol amine (2-Aminoethanol) H ₂ NCH ₂ CH ₂ OH	224SA	1~50 0.5~25	① 2	Pink	Pale purple	Pesticide, solvent, abstergent	2	10	Other Amines, NH ₃ , Hydrazine	3 (J.A) 1 (B)
Morpholine C ₄ H ₉ NO	105SD◎	2~22	1	Pale purple	Pale yellow	Solvent, rubber accelerator	3	10	Amines	20 (A) 10 (B)
Naphthalene C ₁₀ H ₈	153U◎	10~100	1	Pale yellow	Pale blue	Industrial hygiene	1	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	10 (A)
Nickel carbonyl (Nickel tetracarbonyl) Ni(CO) ₄ Concentration chart method	129	20~700	1	Pale yellow	Dark purple	Waste gas analysis	1/2	10	Arsine, Iron carbonyl, Mercury vapour, H ₂ S or SO ₂ (10), CO (1,000)	0.001 (J) CO.05 (A)
Nitric acid vapour HNO ₃	233S ‡	2~20 1~10	① 2	Pale yellow	Purple	Industrial hygiene	1	10	HF (8) or NO ₂ (50), HCl	2 (J.A) - (B)
Nitrogen dioxide NO ₂	117SA	20~ 1,000	1	White	Yellowish orange	Arc welding, acid dipping, garage (diesel exhaust), waste gas analysis in sulphuric & nitric acid dipping of metal products	3	10	Cl ₂ , Br ₂ , I ₂ or Ozone (5), NO (10)	0.2 (A) 0.5 (B)
	117SB	0.5~30.0	2	White	Yellowish orange		1	10	Cl ₂ , Br ₂ , or I ₂ (2), NO (15)	
	117SD	0.1~1.0	3	White	Purple		1.5	2 × 5	O ₃ (2), SO ₂ (7), Cl ₂ (3)	
Nitrogen oxide and dioxide -separately measurable NO & NO ₂ Concentration chart method	174A	NO; 10~300	1	White	Yellowish orange	Industrial hygiene	2	5	Cl ₂ (1)	NO; 25(A), 2(B) NO ₂ ; 0.2(A), 0.5(B)
	174B	NO ₂ ; 1~40			Pale yellowish orange	Flue gas and exhaust gas analysis with hollow glass tubes	2	2 × 5		
Nitrogen oxides NO + NO ₂	175SH	100~ 2,500	1	White	Green	Exhaust gas analysis	2	10	HCl (500)	NO; 25 (A), 2(B) NO ₂ ; 0.2(A), 0.5(B)
	175SA ‡	20~250	1	White	Yellow		1	10	SO ₂ (100), HCl (1,000)	
	175U	1~30 0.5~15	1/2 ①	White	Purple	Industrial hygiene	3	10	H ₂ S (5), HCl (500)	
n-Nonane CH ₃ (CH ₂) ₇ CH ₃	111U◎	10~160 5~80	1/2 ①	Yellow	Brown		2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	200(J.A)
Organic gas checker	186	—	1	Orange	Black or Dark green		3	10	H ₂ S (10)	
Oxygen O ₂	159SA	2~24%	1/2	White	Brown	Oxygen deficiency in underground or closed vessels, tunnels, mines	2	5	CO ₂ (5%), H ₂ S (2%), NO ₂ (2%), SO ₂ (2%)	
	159SB	2~24%	1/2	White	Brown	In the area where the danger of gas explosion exists	2	5		
Oxygen- Non-heating Type O ₂	159SC	3~24% 1.5~3%	1/2 1	Black	White	Oxygen deficiency in underground or closed vessels, tunnels and mines	2	2 × 5		
Oxygen · Carbon dioxide -separation measurement O ₂ & CO ₂	281S	O ₂ ; 2~10%	1	White	Brown	Combustion control	1.5	2 × 5		CO ₂ ; 5000 (J.A.B)
		CO ₂ ; 1~20%		Pink	Yellow					

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† Air flow control orifice is required.

LIST OF KITAGAWA PRECISION GAS DETECTOR TUBES

Gas to be measured (Synonym) Chemical Formula	Tube No.	Measuring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
Ozone O_3	182SA	100~1,000 50~500	1/2 ①	Dark blue	Yellow	Process control	2	10	Cl_2 , NO_2	0.1 (J) 0.05~0.20(A) - (B)
	182SB	10~100 5~50 2.5~25	1/2 ① 2	Blue	Pale yellow		2	10	NO_2 (10)	
	182U	0.15~3.0 0.05~1.0 0.025~0.5	1 ③ 6	Blue	White	Air pollution analysis, industrial hygiene	2	10	NO_2 (0.5), Cl_2 (10), Oxidant	
Pentane $CH_3(CH_2)_3CH_3$	113SB [⊕]	50~1,000	1	Orange	Yellowish green	Industrial hygiene	2	10	Paraffin hydrocarbons, Aromatic hydrocarbons (over C_3), Alcohols (6%), Ketones (6%), Esters (6%)	300 (J) 1,000 (A) 600 (B)
Pentyl acetate (Amyl acetate) $CH_3CO_2(CH_2)_4CH_3$	210U	10~200	3	Yellow	Pale blue	Material of Acrylic resin, industrial hygiene	2	10	Alcohols, Esters, Ketones, Aliphatic hydrocarbons (over C_3), Aromatic hydrocarbons, Halogenated hydrocarbons	50(J.A.B)
Pentyl amine $CH_3(CH_2)_3CH_2NH_2$	105SD [⊕]	2~22	1	Pale purple	Pale yellow	Dyes, insecticide, synthetic detergent, corrosion inhibitor, medicine, petrol additive	3	10	Amines	
Phenol C_6H_5OH	183U	0.5~25.0	2	Pale yellow	Pale brown	Industrial hygiene	2	10	NH_3 (200), Aliphatic amines (50), Phenols (2.5), Aromatic amines (50)	5 (J.A) 2 (B)
Phosgene (Carbonyl chloride) $COCl_2$	146S ‡	0.5~20 0.1~4.0	① 5	White	Red	Leakage detection in mfg. dyes, chemicals, industrial hygiene	1	10	Cl_2 (5), HCl (10), NO_2 (100), SO_2 (0.2%)	0.1 (J.A) 0.02 (B)
Phosphine in acetylene PH_3	121SA †	20~800	1	Pale blue	Reddish purple	Impurity test of calcium carbide & acetylene	3	10	Arsine or H_2S (10)	0.3*(J) 0.05(A) 0.1(B)
	121SB †	5~90	1		Yellowish brown		3	10		
Phosphine PH_3	121SS	400~6,000 200~3,000	1/2 ①	White	Orange	Fumigation of grains	3	10	Hydrogen cyanide (3%), Ammonia (0.6%)	0.3* (J) 0.05 (A) 0.1 (B)
	121SH	200~3,200 100~1,600	1/2 ①	White	Orange	Concentration control in fumigation of tobacco leaves & cereals, doping gas analysis in mfg. semiconductor, industrial hygiene	3	10	NO_2 , H_2S , SO_2	
	121SE	20~1,400 10~700	1/2 ①	White	Brown		3	10	Arsine, Hydrogen selenide, H_2S , Mercaptans, Bromine	
	121SG	5~150	1	White	Yellow		3	10	H_2S (5), H_2Se (5)	
	121SD	1~20.0 0.5~10.0 0.25~5.0	1/2 ① 2	Yellow	Pink	Industrial hygiene, semiconductor mfg. process	1	10	NH_3 (20), Mercaptans, Hydrogen sulphide (50)	
	121U	0.1~2.0 0.05~1.0	① 2	Pale yellow	Pink		2	10	Hydrogen selenide, Mercaptans, H_2S , HCN, SO_2 , Arsine	

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				Original	Stain					
α -Pinene C ₁₀ H ₁₆	158S©	20~300	1	White	Yellow	Materials for perfume and materia medica	3	10	Methanol (0.35%), Ethanol (0.18%), Ethyl acetate (700), Butyl acetate (700), Butadiene (5), Formaldehyde (15), Acetaldehyde (350), Acrylonitrile (400)	
1-Propanol CH ₃ CH ₂ CH ₂ OH	190U©	20~300	1	Yellow	Pale blue		2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	100 (A) 200 (B)
Propane CH ₃ CH ₂ CH ₃	125SA	0.02~ 0.50%	1	Orange	Brown	Mfg. city gas, fire hazard detection	2	10	Toluene, Hexane, Trichloro- ethylene	1,000 (A)
Propionic acid CH ₃ CH ₂ COOH	216S©	3~50	1	Pale pink	Yellow	Mfg. propionate and ester, Nickel-electro plating solution, ester perfume, artificial flavour, medicine, cellulose solvent	3	10	SO ₂ (1/20 × Acetic acid *), NO ₂ (10), HCL (2 × Acetic acid *), Cl ₂ (5)	10 (A.B)
Propyl acetate CH ₃ CO ₂ (CH ₂) ₂ CH ₃	139SB©	0.01~ 1.4%	2	Orange	Brownish green	Fire hazard detection in paints industry & painting, mfg. flavours & perfumes	3	10	Other organic gases or vapours except Halogenated hydrocarbons, Acetylene (3%), Propane (0.2%)	200 (J.B) 100 (A)
	151U	20~ 1,000	1	Yellow	Brown	Paints industry & painting, mfg. flavours & perfumes, industrial hygiene	2	10	Alcohols, Esters, Ketones, Paraffin hydrocarbons, Aromatic hydrocarbons	
Propyl amine CH ₃ CH ₂ CH ₂ NH ₂	105SD©	1~20	1	Pale purple	Pale yellow	Analgesic	3	10	Amines	
Propylene CH ₂ =CHCH ₃	185S	50~ 1,000	1	Yellow	Dark blue	Leakage detection	2	10	CO (200), Acetylene (50), Ethylene, H ₂ S (50)	500 (A)
Propylene oxide (1,2-Epoxypropane) CH ₃ CHCH ₂ O	163SA	1.0~ 5.0% 0.05~ 3.0%	1/2 ①	Orange	Dark brown	Leakage detection in preparation of propylene oxide	3	10	Aromatic hydrocarbons, Esters, Ketones, Alcohols, Halogenated hydrocarbons	2 (J.A) 1 (B)
	122SC©	3~70	1	Pale pink	Yellow		2	2 × 5	Aldehydes, SO ₂ , H ₂ S	
	163SD ‡	0.2~5.0	2	Yellow	Pale pink		1	2 × 5	Formaldehyde	
n-Propyl mercaptan CH ₃ CH ₂ CH ₂ SH	130U	1.15~11.5 0.575~5.75 0.115~1.15	1/2 1 5	Pale yellow	Pink	Industrial hygiene	2	10	Arsine, Hydrogen selenide, H ₂ S, HCN, PH ₃	
Pyridine C ₅ H ₅ N	105SD©	0.5~10	1	Pale purple	Pale yellow	Alcohol denaturant, solvent, paint, medical care, dye of fiber	3	10	Amines	1 (A) 5 (B)
Silane SiH ₄	240S ‡	1~50 0.5~25	① 2	Yellow	Red	Industrial hygiene, semiconductor mfg. process	1	10	PH ₃ (20), Arsine (50), Disilane (2), Diborane (20)	100* (J) 5 (A) 0.5 (B)
Styrene (Vinyl benzene) C ₆ H ₅ CH=CH ₂	158S	5~300 2.5~150	① 2	White	Yellow	Fire hazard detection in synthetic rubber, resin & plastic industry	3	10	Methanol (0.35%), Ethanol (0.18%), Ethyl acetate (700), Butyl acetate (700), Butadiene (5), Formaldehyde (15), Acetaldehyde (350), Acrylonitrile (400)	20 (J) (20) (A) 100 (B)
	158SB	2~100 1~50	② 4	White	Yellow		3	2 × 5		
Sulphur dioxide SO ₂	103SA	0.1~ 3.0%	1	Yellow	Blue	Process control in sulphuric acid paint (chemical mfg.)	3	10	H ₂ S (400)	ST0.25 (A) 0.5 (B)
	103SB	0.02~ 0.3%	1	White	Brown	Process control in sulphuric ore calcination	3	10	H ₂ S (100)	
	103SC	20~300	1	Purple	Yellow	Metal refining, mfg. sulphuric acid & nitric acid, waste gas analysis	2	10	Cl ₂ (1/5 × SO ₂ *), NO ₂ (100), H ₂ S (100 × SO ₂ *)	

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				Original	Stain					
Sulphur dioxide SO ₂	103SD	1~60	1	Pink	Yellow	Metal refining, mfg. sulphuric acid & nitric acid, industrial hygiene	3	10	NO ₂ (1 × SO ₂ *), Cl ₂ (2 × SO ₂ *)	ST0.25 (A) 0.5 (B)
	103SE ‡	0.5~10 0.25~5	① 2	Pink	Yellow	Metal refining, mfg. sulphuric acid & nitric acid, waste gas analysis	1	10	NO ₂ , HCl	
Sulphur dioxide -in flue gas SO ₂	103SF	0.02~ 0.3%	1	White	Orange	Flue gas analysis in heat power plant (with moisture control tube)	3	2 × 5	H ₂ S (100)	
Sulphur dioxide -in carbon dioxide SO ₂	103SG	0.5~25 0.1~3	① 4	Blue purple	White	Process control in beverage industry	3	10	NO ₂ (0.5), H ₂ S (0.5), NH ₃ (1)	
Sulphuric acid H ₂ SO ₄	244U	0.5~5 mg/m ³	5	Yellow	Pink	Petrochemical industry, industrial hygiene	2	10	HCl, HF, NO ₂ , Nitric acid, C ₁₂	1mg/m ³ *(J) 0.2mg/m ³ (A) 0.05mg/m ³ (B)
Tetrachloroethylene (Perchloroethylene) Cl ₂ C=CCl ₂	135SG	0.2~ 2.0% 0.1~ 0.2%	① 2	White	Dark brown	Dry cleaning, metal decreasing, paints industry & painting, solvent recovery control	2	2 × 5	Trichloroethylene, 1, 1, 1-Trichloroethane, 1, 2-Dichloroethylene, Vinyl chloride, CO, Aromatic hydrocarbons	25 (A) 20 (B)
	135SM ‡	125~ 1,250 50~500	1/2 ①	Yellow	Red	Process control in dry cleaning industry	1	10	1,2-Dichloroethylene (10), Trichloroethylene (10)	
	135SA ‡	10~300 5~150 2.1~21	1/2 ① 2	Yellow	Red	Dry cleaning, metal decreasing, paints industry & painting, solvent recovery control	2	10	Vinyl chloride, HCl, 1, 2-Dichloroethylene, Trichloroethylene, Cl ₂	
	135SB ‡	1~10 0.2~2.0	① 4	Pale orange	Blueish purple		1	10	Trichloroethylene, 1, 2-Dichloroethylene or HCl (2), Vinyl chloride (40)	
Tetraethoxysilane Si(OC ₂ H ₅) ₄	243U	12.5~ 200 5~80	1 ②	Yellow	Pale blue	Industrial hygiene	3	10	Silane, Phosphine (5), Isopropyl alcohol (7), Trichloroethylene, Tetrachloroethylene, Ethanol (10)	10 (J.A)
Tetrahydrofuran (CH ₂) ₄ O	102SA©	1.0~ 5.0% 0.2~ 3.0%	1/2 ①	Orange	Dark brown	Fire hazard detection in paints industry & painting, petrochemical industry, industrial hygiene	3	10	Alcohols, Esters, Ketones, Aromatic hydrocarbon	50 (J.A.B)
	162U	20~400 5~100	① 3	Yellow	Pale blue		2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons, Halogenated hydrocarbons	
Tetrahydrothiophen C ₄ H ₆ S	190U©	4~100	3	Yellow	Pale blue	Odorant	2	10	Alcohols, Esters, Paraffin hydrocarbons, Aromatic hydrocarbons, Ketones, Halogenated hydrocarbons	
Toluene (Methyl benzene) C ₆ H ₅ CH ₃	124SH	100~ 3,000	1	White	Dark brown	Solvent recovery control	2	10	Benzene, Xylene, Ethyl benzene, Hexane, Methanol	50 (J.B) 20 (A)
	124SA	10~500	1	White	Brown	Solvent recovery control & fire hazard detection in paints industry & painting, rubber & plastics industry, mfg. dyes, printing inks, adhesives, industrial hygiene	3	10	Benzene (10), Xylene (50), Methanol (1%), Hexane (0.1%), Ethyl benzene (10)	
	124SB	2~100	1	White	Brown	Solvent recovery control	3	10	Aromatic hydrocarbons, Hexane (high conc.)	
o-Toluidine C ₆ H ₄ (CH ₃)(NH ₂)	105SD©	2~22	1	Pale purple	Pale yellow	Dyes, printing	3	10	Amines	1 (J) 2 (A) 0.1 (B)

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				Original	Stain					
p-Toluidine C ₆ H ₄ (CH ₃)(NH ₂)	105SD©	2~20	1	Pale purple	Pale yellow	Analytical reagent, dyes	3	10	Amines	2 (A)
1,1,1-Trichloroethane (Methyl chloroform) CH ₃ CCl ₃	160S ‡	30~400 15~30	① 2	White	Yellowish orange	Metal decreasing & cleaning, extraction of oils & fats, paints industry, industrial hygiene	3	2 × 5	Halogens, Halogenated hydrocarbons	200 (J) 350 (A) 100 (B)
1, 1, 2-Trichloroethane Cl ₂ CHCH ₂ Cl	236SA ‡	10~100	1	White	Purple	Industrial hygiene	1	3 × 5	Nitrogen oxides, Halogens, Halogenated hydrocarbons, Hexane (100)	10 (J.A)
Trichloroethylene Cl ₂ C=CHCl	134SG	0.05~ 2.0%	1	White	Yellow	Metal decreasing & cleaning, dry cleaning & insect fumigation of clothes, mfg. printing inks, industrial hygiene	2	10	Tetrachloroethylene, 1, 1, 1-Trichloroethane, 1, 2-Dichloroethylene, Vinyl chloride, CO, Aromatic hydrocarbons	25 (J) 10 (A) 100 (B)
	134SA ‡	10~300 5~150	1/2 ①	Yellow	Red		2	10	Vinyl chloride, HCl, 1, 2-Dichloroethylene, Tetrachloroethylene, Cl ₂	
	134SB ‡	2.3~36.8 1~16 0.2~3.2	1/2 ① 4	Pale orange	Blueish purple		1	10	Tetrachloroethylene, 1, 2-Dichloroethylene or HCl (2), Vinyl chloride (20)	
Trichlorotoluene C ₆ H ₅ CCl ₃	132SC©	0.2~4	1	Yellowish green	Pink		3	2 × 5	HCl(500), Acetylene(4%), Ethylene(400), Cl ₂ (50)	-
Triethyl amine (C ₂ H ₅) ₃ N	213S	2~20 1~10 0.5~2	1/2 ① 2	Pale purple	Pale yellow	Mfg. emulsifier, organic solvent, waterproofing agent, dyestuff, surface activator and agricultural chemicals etc. industrial hygiene	3	10	NH ₃ , Other Amines	0.5 (A) 2 (B)
Trimethyl amine (CH ₃) ₃ N	105SE©	5~100 2.5~50 0.5~10	1/2 ① 5	Pale purple	Pale yellow		3	10	Sulphur dioxide, Chlorine, Amines	5 (A)
	222S	1~20	1	Pale purple	Pale yellow	Industrial hygiene	3	10	NH ₃ , Other Amines	
1, 2, 4-Trimethyl benzene C ₆ H ₃ (CH ₃) ₃	111U©	10~180	1	Yellow	Brown		2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	25 (J.A.B)
1,3,5-Trimethyl benzene C ₆ H ₃ (CH ₃) ₃	111U©	10~180	1	Yellow	Brown		2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	25 (J.A.B)
2, 2, 4-Trimethyl pentane (CH ₃) ₃ CCH ₂ CH(CH ₃) ₂	113SB©	200~ 4,000 100~ 1,400	1/2 ①	Orange	Yellowish green	Automotive fuel	2	10	Paraffin, Aromatic hydrocarbons, Alcohols (6%), Ketones (6%), Esters (6%)	
n-Undecane CH ₃ (CH ₂) ₉ CH ₃	111U©	10~140	1	Yellow	Brown		2	10	Alcohols, Esters, Ketones, Aromatic hydrocarbons	
n-Valeric acid CH ₃ (CH ₂) ₃ CO ₂ H	216S©	3~70	1	Pale pink	Yellow	Artificial flavour, perfume, lubricant, plasticizer, medicine	3	10	SO ₂ (1/20 × Acetic acid *), NO ₂ (10), HCL (2 × Acetic acid *), Cl ₂ (5)	
Vinyl acetate CH ₃ CO ₂ CH=CH ₂	237S	10~120 5~60	① 2	Yellow	Pale blue	Process control in Acetylene plant	2	10	Ethylene (150), Alcohols, Ethers, Esters	10 (A) 5 (B)
Vinyl chloride (Chloroethylene) CH ₂ =CHCl	132SA	0.05~ 1.0%	1	Brownish orange	Brownish green	Leakage & fire hazard detection in PVC plant, industrial hygiene	3	10	Acetylene (3%), Propane (0.2%), Other organic gases or vapors except Halogenated hydrocarbons (50)	1.5 (J) 1(A.B)
	132SB ‡	5~500	1	White	Reddish orange	Process control, leakage detection and fire hazard detection in synthetic rubber & plastics industry	1.5	2 × 5	Cl ₂ , HCl, Other Halogens, Halogenated hydrocarbons	
	132SC	0.4~12.0 0.2~6.0 0.1~3.0	1 ② 4	Yellowish green	Pink	Industrial hygiene	3	2 × 5	HCl (500), Acetylene (1%), Ethylene (300), Cl ₂ (50)	

‡ This tube must be stored in a refrigerated place (0-10° C/32-50° F).

* Interfered by coexistence more than parenthesized rate.

LIST OF KITAGAWA PRECISION GAS DETECTOR TUBES

Gas to be measured (Synonym) Chemical Formula	Tube No.	Mea- suring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box	Interferences (ppm)	T.L.V (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain					
Water vapour H ₂ O	177SA	1.7~33.8 mg/L	1	Greenish yellow	Purple	Industrial hygiene, process control	3	10	Methanol (0.3%), Ethanol (0.3%), Ethyl acetate (0.3%), Acetone (0.5%), NH ₃ (0.02%), NO ₂ (0.2%)	
	177U	0.05~2.0 mg/L	1	Yellow	Blue (over 0.6mg/L) Yellowish green (below 0.6mg/L)		3	10	Alcohols	
	177UL	3~80 LB/MMCF	1	Yellow	Blue (over 40LB/ MMCF) Yellowish green (below 40LB/ MMCF)	3	10			
	Water vapour -ultra low range H ₂ O	177UR	2~12 LB/MMCF	2	Yellow	Yellowish green	3	10		
Xylene (Dimethyl benzene) C ₆ H ₄ (CH ₃) ₂	143SA	5~1,000	2	White	Brown	Leakage & fire hazard detection in phthalic acid plant, paints industry & painting mfg. dyes, adhesives, printing inks, cleaning fluids, industrial hygiene	1.5	10	Benzene, Toluene, Ethyl benzene, Methanol (1%), Hexane (0.1%)	50 (J.B) 100 (A)
	143SB	5~200	2	White	Brown		2	10	Toluene (1/5 × Xylene)	

‡ This tube must be stored in a refrigerated place (0-10°C/32-50°F).

* Interfered by coexistence more than parenthesized rate.

SUBSTANCES TO BE MEASURED BY USING CONVERSION CHARTS

Conversion charts are available, upon request, for the following listed chemical substances using existing detector tubes within the Kitagawa range. These conversion charts are for use in a temperature of 20°C/68°F.

Other conditions, such as different temperatures, humidity and coexisting gases, are not confirmed.

Please specify the name of the substance to be measured together with the tube number when ordering.

Gas to be measured Chemical Formula	Tube No. to be used	Measuring Range (ppm)	No. of Pump Strokes	Colour Change		Shelf Life (year)	Q'ty of tubes/box	T.L.V. (ppm) J: JPN A: U.S.A B: U.K.
				Original	Stain			
p-Cymene CH ₃ C ₆ H ₄ CH(CH ₃) ₂	102SD	20~200	1	Yellow	Dark brown	2	10	—
Disilane Si ₂ H ₆	240S	1~50	1	Yellow	Red	1	10	—
Ethylene chlorohydrine ClCH ₂ CH ₂ OH	119U	5~300	3	Yellow	Pale blue	2	10	C1 (A)
☆ Benzaldehyde C ₆ H ₅ CHO	190U	5~70	3	Yellow	Pale blue	2	10	—
☆ 1,1,2,2-Tetrachloroethane CHCl ₂ CHCl ₂	236SA ‡	20~80	3	White	Purple	1	3 × 5	1 (J.A)

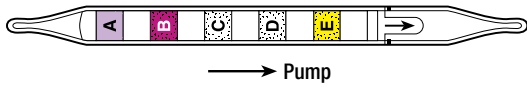
☆ The conversion charts and the measuring ranges may vary with each manufacturing lot.

‡ This tube must be stored in a refrigerated place (0-10°C/32-50°F).

INORGANIC GAS/ORGANIC GAS QUALITATIVE DETECTOR TUBES

Two unique multi-layered qualitative tubes and a special colour chart to identify 60 chemicals in a couple of minutes.

Inorganic Gas Qualitative Detector Tube Tube No.131



A	B	C	D	E	Substances (ppm level)
					Ammonia (5)/ Amines (5) Hydrazine (5)
					Sulphur Dioxide (10) Acetic Acid (15)
					Hydrogen Chloride (20)
					Chlorine (5)
					Nitrogen Dioxide (5)
					Hydrogen Sulphide (10)
					Carbon Monoxide (10)
					Phosphine (2)
					Acetylene (10)
					Methyl Mercaptan (10)

Specifications

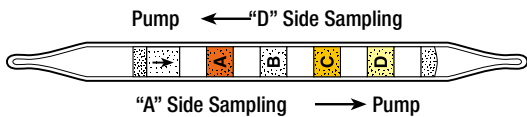
- ① Tube/box : 10 tubes (10-time use)
- ② Pump stroke : 1 (100mL)
- ③ Sampling time : 20 seconds
- ④ Shelf life : 1 year

If Tube No. 131 shows no stains,

test for these substances:

Carbon Dioxide (126SA)
Ethylene(108B)
Hydrogen Cyanide (112SB)
Hydrogen Fluoride (156S)
Nitric Oxide (174A)
Phosgene(146S)

Organic Gas Qualitative Detector Tube Tube No.186B



"A" Side	"D" Side Sampling				Substances to be detected (Detectable limit [ppm])
A	A	B	C	D	
					n-Butane (10) Propane (100) Tetrachloroethylene (100) Trichloroethylene (10) Vinyl Chloride (10)
					Hexane (10) Pentane (10)
					1,3-Butadiene (100)
					Gasoline (0.1 mg/L)
					Benzene (100) Toluene (200)
					Ethyl Benzene (400) Xylene (1000)
					Acetylene (1000) Ethylene (10)
					Styrene (100)
					Acetone (600) Benzene (10) Butyl Acetate (100) Toluene (30) Ethyl Acetate (600) Xylene (60) Ethyl Benzene (60) Ethylene Oxide (100) Kerosine (0.1 mg/L) Methyl Ethyl Ketone (100)
					Formaldehyde (10)
					Heptane (10) Carbon Disulphide (100)
					Methanol (100) 1-Butanol (100) Methyl iso-Butyl Ketone (100) 1,1,1-Trichloroethane (1000)
					Acetaldehyde (100) Ethyl Cellosolve (100) Tetrahydrofuran (100)
					Isopropyl Alcohol (600)
					Acetylene (100) Carbon Monoxide (100)
					Methyl Mercaptan (100)
					Arsine (100) Hydrogen Sulphide (100)
					Cresol (20) Phenol (10)
					Aniline (40)
					Ethyl Amine (100)

Specifications

- ① Tube/box : 10 tubes (5-time use)
- ② Pump stroke : 1 (100mL) +1 (100mL)*
- ③ Sampling time : 30+30 seconds*
- ④ Shelf life : 2 years

* The "A" side sampling and the "D" side sampling are required by using two fresh tubes for one-time analysis.

If Tube No. 186B shows no stains,

test for these substances:

Acetic Acid (216S)
Carbon Tetrachloride (147S)
Methyl Bromide (157SB)
Pyridine(105SD)
Methane and Ethane

NOTE

 means both stain colours are considered equivalent

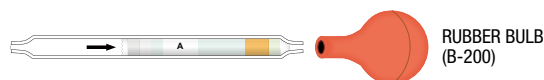
DETECTOR TUBES FOR DISSOLVED SUBSTANCES IN SOLUTION

Substance	Tube No.	Measuring Range (ppm)	Sampling		Colour Change		Typical Applications	Sampling Method	Shelf Life (year)	Q'ty of tubes/box
			Volume (mL)	Time (sec)	Original	Stain				
Sulphide ion S^{2-}	200SA	2~1,000	over 5.0	180	White	Dark brown	Waste water analysis in pulp & paper mills, petroleum refineries, other chemical industries, waste disposal vplants, water treatment plant	Immersion method	1	10
	200SB	0.5~10	over 5.0	150	White	Pale brown			1	10
Chloride ion Cl^{-}	201SA	10~2,000	over 5.0	90	Brown	Pale yellow	Detection of salt water in marine lubricating oils, impurity test, testing portable water supply	Immersion method	3	10
	201SB	3~200	over 5.0	90	Brown	White			2	10
	201SC	1~60	over 5.0	180	Brown	Pale yellow			3	10
Copper ion Cu^{2+}	203S	1~100mg/L	over 5.0	60	White	Orange	Waste water analysis in pulp & paper mills, petroleum refineries, other chemical industries, waste disposal plants, water treatment, school hygiene	Suction method ■	1	10
Cyanide ion CN^{-}	204S	0.2~5	over 5.0	120 to 240	White	Blue	KCN & NaCN in water	Suction method ■	2	10
Salinity NaCl	205SL	0.01~0.8%	over 5.0	30	Brown	White	Detection of salt water in marine lubricating oils, impurity test, testing portable water supply	Suction method □	2	10
Free residual chlorine Cl_2	234SA	0.4~5	over 5.0	180	White	Purple	Detection of dissolved chlorine for disinfection & sterilization of swimming pools, etc.	Immersion method	2	10
Water content in solvent H_2O	77S	10~160mg/L 50~400mg/L	Position C D	10 10	Yellow	Blueish purple	Detection of water content in solvent	Suction method ■	2	10

■ Rubber bulb is required. □ Rubber bulb and filter paper are required.

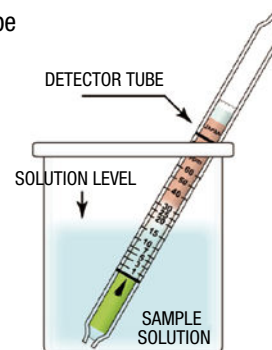
● Suction method

Insert the end of detector tube into the rubber bulb to draw sample solution up.



● Immersion method

Immerse the end of detector tube in a sample solution and use capillary action to soak the sample up.



Tip Cutter



Included in a tube box for dissolved substances in solution, high sensitivity and collection tubes to cut the ends of the detector tubes.

CRIMINAL INVESTIGATION TUBES (FOR SCREENING TEST ONLY)

Tube No.	Detector Tube Chemical Formula	Measuring Range (ppm)	No. of Pump Strokes	Colour Change		Typical Applications	Sampling Method	Shelf Life (year)	Q'ty of tubes/ box
				Original	Stain				
290P	Detector tube for crime investigation	—	1	White	[Gasoline]Brown/dark brown/orange [Kerosene]Pink/dark brown	Discriminate Gasoline and/or Kerosene	Vacuum method	2	10
290P II	Detector tube for crime investigation	—	1	White	[Gasoline]Yellow/brown/greenish brown [Kerosene]Brown/pale pink/pale brown			2	10
290CN ‡ †	Hydrogen cyanide in blood HCN	2~30mg/L	1	Yellow	Red	Screening test to identify cause of one's death	Vacuum method	2	2×5
290CO †	Carbon monoxide in blood CO	20~90%COHb	1	Yellow	Blackish brown			1	2×5
290EA †	Ethyl alcohol in blood C ₂ H ₅ OH	0.2~2.0mg/mL	3	Pink	Pale blue			1	2×5
290HS ‡ †	Hydrogen sulphide in blood H ₂ S	0.1~1.0µg/mL	1	Pale yellow	Pink			1	2×5
290PQ	Paraquat dichloride in blood -qualitative CH ₃ (C ₅ H ₄ N) ₂ CH ₃ Cl ₂	—	—	White	Blue		Injection method	3	10

‡ This tube must be stored in a refrigerated place (0-10°C/32-50°F).

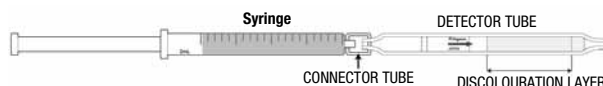
† Air flow control orifice is required.

● Vacuum method

=Use sampling pump AP-20 or AP-1



● Injection method=Connect a syringe to the detector tube and insert sample into the tube.



DETECTOR TUBES FOR COMPRESSED BREATHING AIR SAMPLING

Substances to be measured	Tube No.	Measuring Range (ppm)	Sampling Time (min)	Colour Change		Shelf Life (year)	Q'ty of tubes/ box
				Original	Stain		
Carbon monoxide CO	600SP	5~100 2.5~5	② 4	Yellow	Dark brown	2	10
Carbon dioxide CO ₂	601SP	100~3,000	2	Purplish blue	Pale pink	2	10
Oil mist	602SP	0.3~5mg/m ³	25	Yellow	Pale blue	2	10
Water vapour H ₂ O	603SPA	20~160mg/m ³	1	Yellow	Yellowish green or blue	3	10
Oxygen O ₂	604SP ※	2~24%	1	White	Brown	2	10

※ 50mL plastic syringe and 1m vinyl tube are required.

Compressed breathing air sampling kit is required for above tubes.

HIGH SENSITIVITY TUBES

Tube No.	Gas to be measured Chemical Formula	Measuring Range (ppm)	Sampling		Colour Change		Typical Applications	Shelf Life (year)	Q'ty of tubes/ box
			Flow Rate (mL/min)	Time (min)	Original	Stain			
710 ⚡	Formaldehyde HCHO	0.01~0.12 0.04~0.48	300	30 10	Yellowish orange	Pink	Indoor air pollutants	1	20
710A ⚡		0.05~1.0 0.10~2.0	30	30 15	Yellowish orange	Pink		1	20
713 ⚡		0.01~0.50	350	10	Yellowish orange	Pink		1	20
721 ⚡	Toluene C ₆ H ₃ CH ₃	0.05~1.0	200	20	White	Brown		1	2 × 10
721⊙ ⚡	Ethyl benzene C ₆ H ₄ (C ₂ H ₅) ₂	0.05~1.2						1	2 × 10
721⊙ ⚡	Xylene C ₆ H ₄ (CH ₃) ₂	0.1~1.4						1	2 × 10
730	p-Dichlorobenzene p-C ₆ H ₄ Cl ₂	0.01~0.40	200	15	Orange	Reddish purple	Indoor air pollutants	1	2 × 10
730⊙	1,4-Dichloro-2-butene ClCH ₂ CH=CHCH ₂ Cl	0.05~0.6	200	15	Orange	Reddish purple	Process control in mfg. synthetic rubbers	1	2 × 10
740	Nitrogen dioxide NO ₂	0.01~0.1 0.02~0.2	200	20 10	White	Reddish purple	Atmospheric environment measurement	2	10
770	Hydrogen fluoride HF	0.05~1.0	250	10	Pale yellow	Pink	Industrial hygiene	2	10
900NHH	Ammonia NH ₃	10~80µg/m ³	400	60	Pale purple	Pale yellow	For cultural-property protection in art galleries and museums	2	10
901NHL		1~12µg/m ³	400	60	Pale purple	Pale yellow	For clean room monitoring of semiconductor industries	2	10
910	Organic acid	Acetic acid; 10~400µg/m ³ 25~1000µg/m ³	200	60 30	Pale pink	Pale yellow	For cultural-property protection in art galleries and museums	3	10
		Formic acid; 20~800µg/m ³	200	60					

⚡ This tube must be stored in a refrigerated place (0~10°C/32~50°F).
Air Sampler is required for above tubes.

To check suction power, air flow direction and speed of an air flow from draft, duct, ventilation fans and hoods by generating white smoke.

Air Flow Indicator Tube 301



<Tube no.301> includes;

- Air flow indicator tube×10
- Tip cutter
- Cap×4

Used with air flow indicators AS-1, AS-2 or AS-3. Air flow indicator tube has a film coating to avoid scattering of reagents inside for safe check.

Complies with OSHA(Occupational Safety and Health Administration, UNITED STATES DEPARTMENT OF LABOR)'S protocol for respirator fit testing(29CFR 1910 134 App A).

<CAUTION FOR USE>

Air flow indicator tube fills smoke generators in a glass tube. They react with vapour in the air and generate white smoke. The white smoke generated includes toxic hydrogen chloride.

Pay attention to the following:

- Do not breathe or touch the white smoke. The white smoke may irritate eyes, nose and throat. If breathed, immediately gargle. When smoke touches the skin, wash it off with water.
- The smoke corrodes metals or causes malfunction. Do not use near precision instruments.
- Do not use in confined spaces, crowded places or residential areas.
- Do not use in hospitals, food handling places or clean rooms.

Air Flow Indicators AS-1/AS-2 (for continuous monitoring)



<AS-1> includes;

- Rubber bulb
- Carrying case

<AS-2> includes;

- Rubber bulb and air reservoir
- Carrying case

* Air flow indicator tubes are sold separately.

AS-1 and AS-2 do not carry any heat sources so are an ideal for visual examine in explosion-risk areas.

AS-1 : Insert the air flow indicator tube into the rubber bulb and squeeze the bulb to generate the white smoke. One tube makes about 100 times smoke.

AS-2 : Insert the air flow indicator tube into the inlet of the rubber bulb and squeeze the bulb to generate the white smoke continuously by putting through an air-buffer in the air reservoir. The white smoke continues for about one minute.

Air Flow Indicator AS-3 (for remote monitoring)



* Air flow indicator tubes are sold separately.

For continuous or intermittent air flow check where ventilation fan or hood is unreachable or located at confined spaces up to 2 metres.

SPECIFICATION

Pump	Diaphragm
Power supply	4×AA size alkaline dry battery
Run time	Approx. 4 hours (alkaline dry batteries, with air flow indicator tube)
Size	51(W)×67(H)×84(D)mm(pump part), length 2m
Weight	300g (including dry batteries)

△ Non-explosion proof. Do not use in explosion-risk areas.

Smoke Generator SG-1



- Compact, light and simple operation
- USP food grade smoke reagents (propylene glycol and glycerin)
- Capable of generating smoke in all directions
- Replaceable cartridge

SPECIFICATION

Power supply	4×AA size alkaline dry battery
Run time	About 1,000 times one-second-smoke at MANUAL mode About 30 times thirty-second-smoke at AUTO mode
Size	35(W)×185(H)×35(D) mm
Weight	110 g (excluding batteries)
Accessory	SGC-1 cartridge ×1, Alkaline battery×4
Option	Leather case

△ Non-explosion proof. Do not use in explosion-risk areas.

△ Do not use in clean rooms.

SPECIAL DETECTOR KIT FOR GAS DETECTOR TUBES

We develop and offer various rapid and easy detection kits using gas detector tubes applying our build up technique for variety of industries, where means for analyzing are used to require expertise and significant time and money.

Flue Gas Sampler P-10FG



Measures gas samples from a gas duct such as Nitrogen oxides, Sulphur dioxide, Oxygen to prevent pollution easily and quickly. For voluntary control of emission standard.

<P-10FG> includes;

- AP-20B sampling pump
- Stainless steel sampling probe (Length 980mm when 3 probes connected)
- Thermometer (0~300°C)
- Ribbon heater(AC220V, 50W)
- Suction pump
- Rubber connection tube (1.5m)
- Carrying case

* Gas Detector tubes are sold separately.

Detector tubes for P-10FG

Gas to be measured	Tube no.	Measuring range	Shelf life	Q'ty of tubes/box
Carbon monoxide	126SH	1~20%	2	10
Hydrogen chloride	173SA	20~1,200ppm	3	2 × 5
Nitro-oxide compound	174B	NO:10~300ppm	2	2 × 5
		NO ₂ :1~40ppm		
Nitrogen oxides	175SA	20~250ppm	1	10
	175SH	100~2,500ppm	2	10
Oxygen	159SC	1.5~24%	2	2 × 5
Sulphur dioxide	103SC	20~300ppm	2	10
	103SD	1~60ppm	3	10
	103SF	0.02~0.30%	1	2 × 5

Simple Measurement Set for Chlorocarbons in Drainage P-20/P-24AP

Offers easy detection of solvents in drainage by measuring the head space gas with detector tubes where contaminating public water or groundwater caused by chlorine-based organic solvents from dry cleaning or cleansing of semiconductor component bring a problem.



<P-20> includes;

- Resinous gas collector (100mL)
 - B-190 Tip cutter
 - Collecting bottle (500mL)
 - Thermometer
 - ◎ AP-20 sampling pump is required for 50mL sampling.
- * Gas Detector tubes are sold separately.



<P-24AP> includes;

- AP-20B sampling pump
 - Grease
 - Rubber tube connector×2
 - Hand strap
 - Collecting bottle (500mL)×5
 - Thermometer
 - Carrying case
- * Gas Detector tubes are sold separately.

Detector tubes for P-20/P-24AP

Gas to be measured	Tube no.	Measuring range (mg/L)	Q'ty of tubes/box
Benzene	118SC	0.1~1.5	10
Carbon tetrachloride	147S ‡	0.1~1.0	2 × 5
1,2-Dichloroethane	230SA ‡	0.3~3.7	3 × 5
1,1-Dichloroethylene	132SC	0.01~0.27	2 × 5
cis-1,2-Dichloroethylene	145S ‡	0.1~2.7	10
Dichloromethane	180S ‡	2~54	2 × 5
1,1,1-Trichloroethane	160S ‡	0.67~9.0	2 × 5
1,1,2-Trichloroethane	236SA ‡	1.4~5.6	3 × 5
1,3-Dichloropropene	132SC	0.02~0.5	2 × 5
Trichloroethylene◎ () is the maximum range available with P-20.	134SA ‡	0.15~8.80(4.40)	10
	134SB ‡	0.03~1.00(0.47)	10
Tetrachloroethylene◎ () is the maximum range available with P-20.	135SA ‡	0.14~8.20(4.10)	10
	135SB ‡	0.03~0.64(0.27)	10

‡ This tube must be stored in a refrigerated place (0-10°C/32-50°F)

Compressed Breathing Air Sampling Kit P-41R



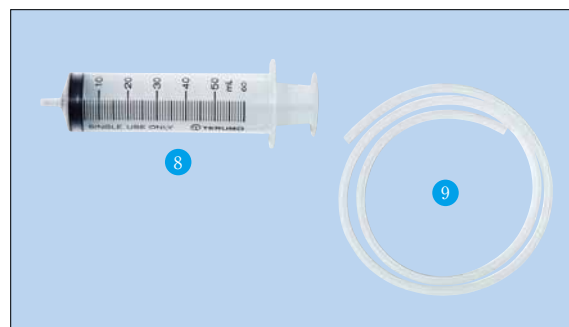
Impurities in breathing air for respiration can adversely affect human health. The kit is designed to measure these contaminants in SCBA, SCUBA and other pressurized breathing air cylinders, as well as directly from the outlet of an air compressor or purifier. The kit easily measures five components within minutes : carbon monoxide, carbon dioxide, oil mist, water vapor and oxygen by aerating the detector tube with an exclusive reducing valve from the breathing air source.

<P-41R> includes;

- ① Control assembly
(Including an adapter with W22-14RH Female thread for rescue and on-land cylinders)
 - ② International fitting yoke (For a scuba cylinder)
 - ③ Tube protector
 - ④ Tip cutter for gas detector tubes
 - ⑤ Wrench
 - ⑥ Digital stopwatch
 - ⑦ Carrying case (Aluminum)
- * Gas detector tubes are sold separately.

Detector tubes for P-41R

Gas to be measured	Tube no.	Measuring range	Shelf life	Q'ty of tubes/box
Carbon monoxide	600SP	5~100ppm	2	10
Carbon dioxide	601SP	100~3,000ppm	2	10
Oil mist	602SP	0.3~5mg/m ³	2	10
Water vapour	603SPA	20~160mg/m ³	3	10
Oxygen	604SP	2~24%	2	10



Optional Accessories for 604SP only;

- ⑧ 50mL plastic syringe
- ⑨ 1m vinyl tube

Harmful Gas Detector for Disaster Relief P-50/UFO-IIH



In various disasters blown up, rescue teams often suffer from secondary disasters. Among them, disasters caused by invisible toxic gases make relief efforts dangerous.

The kits offer fast and easy detection of toxic gases at rescue site.

<UFO-IIH> includes;

- P-50 x 1
- Following detector tubes

○ For inorganic gases

		※
Ammonia	105SB	10
Carbon dioxide	126SA	10
Carbon disulphide	141SA	5
Carbon monoxide	106SA	10
Chlorine	109SB	10
Hydrogen chloride	173SB	5
Hydrogen cyanide	112SB	10
Hydrogen fluoride	156S	10
Hydrogen selenide	167S	10
Hydrogen sulphide	120SB	10
Nitric acid vapour	233S	10
Nitro-oxide compound	174A	5
Phosgene	146S	10
Sulphur dioxide	103SD	10

○ For organic gases

		※
Acetylene	101S	10
Chloroform	152S	5
Ethylene oxide	122SA	10
Methyl alcohol	119SA	10
Methyl amine	227S	10
Toluene	124SA	10

※Measurement times/box.

<P-50> includes;

- Detector tubes
131 Inorganic Gas Qualitative Tube
186B Organic Gas Qualitative Tube
- Gas qualitative flow charts
- AP-20B sampling pump×2
- SH-5N extension hose(5m)
- B-191 Tip cutter
- Container for used tubes
- Carrying case

Air Sampling Pump ASP-1200



Designed to be used with detector tubes, DNPH tubes and charcoal tubes.

- High suction power
- 10 measuring patterns can be registered
- Enhances dust proof and water proof capabilities (equivalent to “IP43”)

SPECIFICATION

Flow range	10-1200mL/min (constant flow function)
Flow volume accuracy	10-100mL/min : ± 5 mL/min 100-1200mL/min : $\pm 5\%$ against indication value
Accumulated flow volume indication range	0.0-9999.9L
Accumulated sampling time indication range	00:00-99:59 (hour:minute)
Timer	Set start-time and end-time
Operating temperature & humidity	0-40°C ; 0-90%RH (non-condensing)
Power supply	4×AA size battery (alkaline, nickel metal-hydrate, or lithium) AC power (input AC100-240V 50/60Hz, output DC5V Max 1.8A, USB Micro-B terminal(male))
Size & weight	145(W)×99(H)×54(D)mm 490g (including batteries)
Options	Impinger holder, impinger hook, replacement filter (10pcs)

Air Sampling Pump High Flow ASP-6000



Designed to be used with gas detector tubes and sorbent tubes and to collect dust with a holder for collection and liquid with a impinger.

- Wide flow range from 0.10 ~ 6.00L/min
- High suction pressure
- Saves up to 10 sampling conditions

SPECIFICATION

Flow range	0.10 ~ 6.00L/min
Flow volume accuracy	0.00 ~ 1.00L/min : ± 0.05 L/min, 1.00 ~ 6.00L/min : ± 5 of indicated value at calibration with designated flow volume 1.00 ~ 6.00L/min : $\pm 3\%$ RD of flow volume 1 point
Accumulated flow volume indication range	0.0-9999.9L
Accumulated sampling time indication range	00:00-99:59 (hour:minute)
Timer	Set start-time and end-time
Run time	Approximately 5 hours (full charge, 5.00L/min, no-load, 25 $\pm$ 5°C)
Operating temperature & humidity	0-40°C ; 10-85%RH (non-condensing)
Power supply	Rechargeable Lithium-ion battery or AC adaptor (USB TYPE-C)
Size & weight	160(W)×110(H)×85(D)mm(excluding protruding) 900g
Options	Impinger holder, impinger hook, holder hook to collect particles, replacement filters x 10

Air Sampling Pump TWP-1



Designed to be used with gas detector tubes and charcoal tubes.

- Independent 2 suction ports
- To sample 2 detector tubes or charcoal tubes at one time
- Saves up to 10 sampling conditions for each suction ports

SPECIFICATION

Flow range	10-1200mL/min (constant flow function)
Flow volume accuracy	10-100mL/min : ± 5 mL/min 100-1200mL/min : $\pm 5\%$ against indication value
Accumulated flow volume indication range	0.0-9999.9L (at 20°C or 25°C conversion)
Accumulated sampling time indication range	00:00-99:59 (hour:minute)
Timer	Set start-time and end-time
Operating temperature & humidity	0-40°C ; 0-90%RH (non-condensing)
Power supply	4×AA size battery (alkaline, nickel metal-hydrate, or lithium) AC power (input AC100-240V 50/60Hz, output DC5V Max 1.8A, USB Micro-B terminal(male))
Size & weight	209(W) X 99(H) X 54(D)mm 490g (including batteries)
Options	Impinger holder, impinger hook, replacement filter (10pcs)

Air Sampling Pump DSP-550



Collects samples into a sampling bag directly for air sampling in work environment.

- Almost zero VOC adsorption inside the air sampling pump
- Small, excellent quietness and no vibration
- * Tripod and sampling bag are sold separately.

SPECIFICATION

Flow volume setting range	50-550mL/min (constant flow function)
Flow volume accuracy	Either ± 10 mL/min or within $\pm 5\%$ against flow volume setting, whichever greater
Accumulated flow volume indication range	0.00-99.99L
Accumulated sampling time indication range	00:00-99:59 (hour:minute)
Timer	Set start-time and end-time
Operating temperature & humidity	0-40°C ; 0-90%RH (non-condensing)
Power supply	2×AA size battery(alkaline, nickel metal-hydride) or USB power DC5V(output 0.5A or more) Micro-USB B connector
Size & weight	68(W)×120(H)×31(D)mm 170g (including batteries)
Options	Replacement filter with tube (3pcs)

COLLECTION TUBES

Charcoal Tube 800B

To collect organic solvent vapour.



In conformity with NIOSH requirements.

Scavenger : coconut shell charcoal
 Fill ration : 1st layer : 100mg
 2nd layer : 50mg
 ● 20 tubes/box, cap 40 pcs
 sticker 20 pcs, tip cutter

Charcoal Tube 800EC

To collect organic solvent vapour.



A scratch for easy cut of the tube.

Scavenger : synthetic charcoal
 Fill ration: 1st layer : 100mg
 2nd layer : 50mg
 ● 10 tubes/box, cap 20 pcs
 sticker 10 pcs, tip cutter

Silica Gel Tube 801

To collect polar solvent vapour such as methanol, acetone.



Scavenger : silica gel type A
 Fill ration : 1st layer : 300mg
 2nd layer : breakthrough indicator
 ● 10 tubes/box, cap 20 pcs
 sticker 10 pcs, tip cutter

DNPH-Treated Silica Gel Sorbent Cartridge 815H

To collect aldehydes and ketones.



Scavenger : DNPH-treated silica gel
 Fill ration : 400mg
 ● 10 pcs/bag, sticker 10 pcs
 Shelf life : 1 year

Option

Tube Holder

STH-800A / STH-800B

STH-800A for 800EC/801
 STH-800B for 800B

⚠ This cartridge must be stored in a refrigerated place (0-10°C/32-50°F).



LIST OF SYNONYMS

Synonym	Detector Tube Name
Acetic acid dimethylamide	n,n-Dimethyl acetamide
Acetic acid ethenyl ester	Vinyl acetate
Acetic aldehyde	Acetaldehyde
Acetic oxide	Acetic anhydride
1-Acetoxyp propane	Propyl acetate
Acetyl oxide	Acetic anhydride
Acetylene dichloride	1,2-Dichloroethylene
Acrylic acid ethyl ester	Ethyl acrylate
Acrylic acid n-butyl ester	Butyl acrylate
Acrylic acid, methyl ester	Methyl acrylate
Acrylic aldehyde	Acrolein
Aminobenzene	Aniline
1-Aminobutane	n-Butyl amine
Aminocyclohexane	Cyclohexyl amine
Aminoethane	Ethyl amine
2-Aminoethanol	Monoethanol amine
Aminomethane	Methyl amine
1-Amino-2-methylbenzene	o-Toluidine
1-Amino-4-methylbenzene	p-Toluidine
1-Aminopropane	Propyl amine
2-Aminopropane	Isopropyl amine
2-Aminotoluene	o-Toluidine
4-Aminotoluene	p-Toluidine
Amyl acetate	Pentyl acetate
Amyl hydride	Pentane
Benzene chloride	Chlorobenzene
Benzenamine	Aniline
Benzenetetrahydride	Cyclohexene
Benzol	Benzene
Biethylene	1,3-Butadiene
Boroethane	Diborane
Bromoethane	Ethyl bromide
Bromomethane	Methyl bromide
1-Butanamine	n-Butyl amine
Butane	n-Butane
n-Butanoic acid	n-Butyric acid
n-Butanol	1-Butanol
2-Butanone	Methyl ethyl ketone
2-Butenal	Crotonaldehyde
1-Butoxybutane	Butyl ether
2-Butoxyethanol	Butyl cellosolve
n-Butyl alcohol	1-Butanol
sec-Butyl alcohol	2-Butanol
tert-Butyl alcohol	tert-Butanol
Butyl ethanoate	Butyl acetate
n-Butyl methyl ketone	Methyl butyl ketone
Butyl 2-propenoate	Butyl acrylate
Carbinol	Methyl alcohol
Carbolic acid	Phenol
Carbonyl chloride	Phosgene
Chlorobenzol	Chlorobenzene
Chlorobromomethane	Bromochloromethane
2-Chlorobutadiene	Chloroprene
2-Chloro-1,3-butadiene	Chloroprene
1-Chloro-2,3-epoxypropane	Epichlorohydrin
Chloroethene	Vinyl chloride
2-Chloroethyl ether	2,2'-Dichloroethyl ether
Chloroethylene	Vinyl chloride
β -Chloroprene	Chloroprene
Cyanoethylene	Acrylonitrile
Cyclohexanamine	Cyclohexyl amine
Cyclohexatriene	Benzene
Cyclohexyl alcohol	Cyclohexanol
Cyclohexyl ketone	Cyclohexanone
Cyclohexylmethane	Methyl cyclohexane
DCM	Dichloromethane

Synonym	Detector Tube Name
DCP	1,3-Dichloropropene
Decalin	Decahydronaphthalene
Decane	n-Decane
Diamide	Hydrazine
Diamine	Hydrazine
1,2-Dibromoethane	Ethylene dibromide
1,2-Dichlorobenzene	o-Dichlorobenzene
1,4-Dichlorobenzene	p-Dichlorobenzene
1,1-Dichloroethene	1,1-Dichloroethylene
1,2-Dichloroethene	1,2-Dichloroethylene
Dichloroethyl ether	2,2'-Dichloroethyl ether
1,3-Dichloropropylene	1,3-Dichloropropene
1,3-Dicyclopentadiene	Dicyclopentadiene
Diethyl ether	Ethyl ether
1,4-Diethylene dioxide	1,4-dioxane
Diethylene oxide	Tetrahydrofuran
1,2-Dihydroxyethane	Ethylene glycol
Diisopropyl ether	Isopropyl ether
Dimethyl benzene	Xylene
Dimethyl ketone	Acetone
Dimethylacetamide	n,n-Dimethyl acetamide
Dimethylacetic acid	Isobutyric acid
Dimethylcarbinol	Isopropyl alcohol
Dimethylene oxide	Ethylene oxide
1,1-Dimethylethane	Isobutane
1,1-Dimethylethanol	tert-Butanol
1,1-Dimethylethylene	Isobutylene
Dimethylformamide	n,n-Dimethylformamide
2,6-Dimethyl-4-heptanone	Diisobutyl ketone
Di-n-butyl ether	Butyl ether
DIPA	di-iso-Propyl amine
Divinyl	1,3-Butadiene
Divinylene oxide	Furan
DMA	Dimethyl amine
DMF	n,n-Dimethylformamide
DVB	Divinyl benzene
EDB	Ethylene dibromide
1,2-Epoxyethane	Ethylene oxide
1,2-Epoxypropane	Propylene oxide
ETBE	Ethyl-tert-butyl-ether
Ethanal	Acetaldehyde
Ethanamine	Ethyl amine
1,2-Ethandiol	Ethylene glycol
Ethanethiol	Ethyl mercaptan
Ethanoic acid	Acetic acid
Ethanoic anhydride	Acetic anhydride
Ethanol	Ethyl alcohol
Ethene	Ethylene
Ethenylbenzene	Styrene
Ethenylmethylbenzene	Methyl styrene
Ether	Ethyl ether
Ethine	Acetylene
2-Ethoxyethanol	Ethyl cellosolve
2-Ethoxy-2-methylpropane	Ethyl-tert-butyl-ether
Ethyl acetone	Methyl propyl ketone
Ethyl aldehyde	Acetaldehyde
Ethyl methyl ketone	Methyl ethyl ketone
Ethyl oxide	Ethyl ether
Ethyl propenoate	Ethyl acrylate
Ethyl silicate	Tetraethoxysilane
Ethyl-2-methyl-2-propenoate	Ethyl methacrylate
Ethyl-2-methylacrylate	Ethyl methacrylate
Ethylacetic acid	n-Butyric acid
Ethylbenzol	Ethyl benzene
Ethylene dichloride	1,2-Dichloroethane
Ethylene glycol ethyl ether acetate	Ethyl cellosolve acetate

Synonym
Ethylene glycol monobutyl ether
Ethylene glycol monoethyl ether
Ethylene glycol monomethyl ether
Ethylene glycol monomethyl ether acetate
Ethylene tetrachloride
Ethylene trichloride
Ethylenecarboxylic acid
Ethylformic acid
Ethylidene chloride
Formonitrile
2-Furacarbinal
2-Furaldehyde
2-Furancarboxyaldehyde
2,5-Furandione
Furfuran
2-Heptanone
Hexahydrobenzene
Hexahydromethylphenol
Hexahydrophenol
Hexahydrotoluene
Hexalin
Hexamethylene
Hexanaphthene
Hexanaphthylene
2-Hexanone
Hexone
Hexyl hydride
Hydrocyanic acid
Hydrogen carboxylic acid
Hydrogen dioxide
Hydroperoxide
Hydroxybenzene
2-Hydroxyethylamine
2-Hydroxymethylfuran
4-Hydroxy-4-methylpentan-2-one
3-Hydroxypropene
Iodomethane
Isoacetophorone
Isoamyl acetate
Isoamyl alcohol
Isobutanol
Isobutene
Isobutyltrimethylmethane
Isooctane
Isopropanol
2-Isopropoxypropane
Isopropylacetone
isopropylbenzene
Isovalerone
Ketohexamethylene
MBK
MEK
Mercaptomethane
Methacrylic acid mehtyl ester
Methanal
Methanamine
Methane trichloride
Methanecarboxylic acid
Methanethiol
Methanoic acid
Methanol
2-Methoxyethanol
2-Methoxyethyl acetate
2-Methoxy-2-methyl propane
Methyl acetone
Methyl aldehyde

Detector Tube Name	Synonym	Detector Tube Name	Synonym	Detector Tube Name
Butyl cellosolve	Methyl benzene	Toluene	Phenic acid	Phenol
Ethyl cellosolve	2-Methyl butylacrylate	Butyl methacrylate	Phenyl chloride	Chlorobenzene
Methyl cellosolve	Methyl chloroform	1,1,1-Trichloroethane	Phenylamine	Aniline
Methyl cellosolve acetate	Methyl ether	Dimethyl ether	Phenylethane	Ethyl benzene
Tetrachloroethylene	Methyl ethylene glycol	Propylene glycol	Phenylethylene	Styrene
Trichloroethylene	Methyl ethylene oxide	Propylene oxide	Phenylmethane	Toluene
Acrylic acid	Methyl isothiocyanate	MITC	2-Phenylpropane	Cumene
Propionic acid	Methyl ketone	Acetone	Propanamine	Propyl amine
1,1-Dichloroethane	Methyl propenal	Crotonaldehyde	2-Propaneamine	Isopropyl amine
Hydrogen cyanide	Methyl tert-butyl ether	tert-Butyl methyl ether	1-Propanecarboxylic acid	n-Butyric acid
Furfuryl alcohol	Methyl tribromide	Bromoform	1,2-Propanediol	Propylene glycol
Furfural	2-Methyl-1,3-butadiene	Isoprene	1-Propanethiol	n-Propyl mercaptan
Furfural	3-Methyl-1-butanol	Isopentyl alcohol	Propanoic acid	Propionic acid
Maleic anhydride	2-Methyl-1-propanol	Isobutyl alcohol	2-Propanol	Isopropyl alcohol
Furan	2-Methyl-2-propanethiol	tert-Butyl mercaptan	2-Propanone	Acetone
Methyl amyl ketone	2-Methyl-2-propanol	tert-Butanol	2-Propenal	Acrolein
Cyclohexane	Methylacetic acid	Propionic acid	Propene	Propylene
Methyl cyclohexanol	β -Methylacrolein	Crotonaldehyde	2-Propenenitrile	Acrylonitrile
Cyclohexanol	2-Methylbutadiene	Isoprene	2-Propenoic acid	Acrylic acid
Methyl cyclohexane	3-Methylbutyl acetate	Isopentyl acetate	Propenyl alcohol	Allyl alcohol
Cyclohexanol	2-Methylpropane	Isobutane	1-Propyl acetate	Propyl acetate
Cyclohexane	2-Methylpropanoic acid	Isobutyric acid	2-Propyl acetate	Isopropyl acetate
Cyclohexane	2-Methylpropene	Isobutylene	n-Propyl alcohol	1-Propanol
Cyclohexene	2-Methylpropeonic acid	Methacrylic acid	n-Propyl amine	Propyl amine
Methyl butyl ketone	2-Methylpropyl acetate	Isobutyl acetate	n-Propyl bromide	1-Bromopropane
Methyl isobutyl ketone	Methyl 2-methylpropenoate	Methyl methacrylate	Propylacetic acid	n-Valeric acid
n-Hexane	4-Methyl-2-pentanone	Methyl isobutyl ketone	Propylene dichloride	1,2-Dichloropropane
Hydrogen cyanide	4-Methyl-3-penten-2-one	Mesityl oxide	Propylene glycol monomethyl ether	1-Methoxy-2-propanol
Formic acid	Methyl-2-propenoate	Methyl acrylate	Prussic acid	Hydrogen cyanide
Hydrogen peroxide	Methylene bromide	Dibromomethane	Pseudocumene	1,2,4-Trimethyl benzene
Hydrogen peroxide	Methylene oxide	Formaldehyde	Selenium hydride	Hydrogen selenide
Phenol	Methylene chloride	Dichloromethane	Silicon tetrahydride	Silane
Monoethanol amine	Methylene dibromide	Dibromomethane	TCE	Trichloroethylene
Furfuryl alcohol	Methylene oxide	Formaldehyde	Tetrachlorocarbon	Carbon tetrachloride
Diacetone alcohol	1-Methylethylamine	Isopropyl amine	Tetrachloromethane	Carbon tetrachloride
Allyl alcohol	Methylethylene	Propylene	Tetraethyl silicate	Tetraethoxysilane
Methyl iodide	Methylsulphide	Dimethyl sulphide	Tetrahydro-1,4-oxazine	Morpholine
Isophorone	Methyltrichloromethane	1,1,1-Trichloroethane	Tetramethylene oxide	Tetrahydrofuran
Isopentyl acetate	MIBK	Methyl Isobutyl ketone	Tetramethylene sulphide	Tetrahydrothiophene
Isopentyl alcohol	MITC	Methylisothiocyanate	Thiobismethane	Dimethyl sulphide
Isobutyl alcohol	Monobutylamine	n-Butyl amine	Thiocyclopentane	Tetrahydrothiophene
Isobutylene	Monoethylene glycol	Ethylene glycol	Thioethyl alcohol	Ethyl mercaptan
2,2,4-Trimethyl pentane	Monomethylamine	Methyl amine	Thiomethanol	Methyl mercaptan
2,2,4-Trimethyl pentane	Monomethylaniline	n-Methyl aniline	TMA	Trimethyl amine
Isopropyl alcohol	Monosilane	Silane	Toluol	Toluene
Isopropyl ether	MPK	Methyl propyl ketone	Tribromomethane	Bromoform
Methyl isobutyl ketone	MTBE	tert-Butyl methyl ether	β -Trichloroethane	1,1,2-Trichloroethane
Cumene	N-Butyl-1-butanamine	Di-n-Butyl amine	Trichloroethene	Trichloroethylene
Diisobutyl ketone	N-Ethylethanamine	Diethyl amine	Trichloromethane	Chloroform
Cyclohexanone	N-Methylbenzenamine	N-Methyl aniline	Trichloronitromethane	Chloropicrin
Methyl butyl ketone	Nickel tetracarbonyl	Nickel carbonyl	Trimethylmethane	Isobutane
Methyl ethyl ketone	Nitrochloroform	Chloropicrin	VAM	Vinyl acetate
Methyl mercaptan	Nitrogen hydride	Hydrazine	VCM	Vinyl chloride
Methyl methacrylate	N,N-Diethylamine	Diethyl amine	Vinyl carbinol	Allyl alcohol
Formaldehyde	N,N-Diethylethanamine	Triethyl amine	Vinyl cyanide	Acrylonitrile
Methyl amine	N,N-Dimethylmethanamine	Trimethyl amine	Vinyl toluene	Methyl styrene
Chloroform	N,N-Dimethylphenylamine	N,N-Dimethyl aniline	Vinyl trichloride	1,1,2-Trichloroethane
Acetic acid	N-2-Propanamine	Di-iso-Propyl amine	Vinylbenzene	Styrene
Methyl mercaptan	Oxirane	Ethylene oxide	Vinylethylene	1,3-Butadiene
Formic acid	Pentanoic acid	n-Valeric acid	Vinylstyrene	Divinyl benzene
Methyl alcohol	2-Pentanone	Methyl propyl ketone	Vinylidene chloride	1,1-Dichloroethylene
Methyl cellosolve	1-Pentyl acetate	Pentyl aetate	Wood alcohol	Methyl alcohol
Methyl cellosolve acetate	PER	Tetrachloroethylene		
tert-Butyl methyl ether	Perchloroethylene	Tetrachloroethylene		
Methyl ethyl ketone	Perhydronaphthalene	Decahydronaphthalene		
Formaldehyde	Petrol	Gasoline		

LIST OF KITAGAWA PRECISION GAS DETECTOR TUBES BY TUBE NO.

Tube No.	Detector Tube Name	Tube No.	Detector Tube Name	Tube No.	Detector Tube Name	Tube No.	Detector Tube Name
77S	Water content in solvent	108B	Ethylene	119U	Methyl alcohol	130U	n-Propyl mercaptan
100	Carbon monoxide	108SA	Ethylene	119U©	1,4-Dioxane	131	Inorganic gas-qualitative
101S	Acetylene	108SC	Ethylene	120SB	Hydrogen sulphide	132SA	Vinyl chloride
102SA	Acetone	109SA	Chlorine	120SC	Hydrogen sulphide-in the	132SB	Vinyl chloride
102SA©	Tetrahydrofuran	109SB	Chlorine		presence of sulphur dioxide	132SC	Vinyl chloride
102SC	Acetone	109U	Chlorine	120SD	Hydrogen sulphide	132SC©	Allyl chloride
102SD	Acetone	110S	Gasoline	120SE	Hydrogen sulphide	132SC©	Benzyl chloride
103SA	Sulphur dioxide	111SA	Ethyl acetate	120SF	Hydrogen sulphide	132SC©	m-Chlorotoluene
103SB	Sulphur dioxide	111SA©	Methyl acetate	120SH	Hydrogen sulphide	132SC©	o-Chlorotoluene
103SC	Sulphur dioxide	111U	Ethyl acetate	120SM	Hydrogen sulphide	132SC©	p-Chlorotoluene
103SD	Sulphur dioxide	111U	Isopropyl acetate	120U	Hydrogen sulphide	132SC©	1,1-Dichloroethylene
103SE	Sulphur dioxide	111U©	tert-Butanol	120UH	Hydrogen sulphide	132SC©	Trichlorotoluene
103SF	Sulphur dioxide in flue gas	111U©	Butyl ether	120UT	Hydrogen sulphide	133A	Acetaldehyde
103SG	Sulphur dioxide	111U©	Butyl methacrylate	121SA	Phosphine in acetylene	133SB	Acetaldehyde
104SA	Ethyl alcohol	111U©	tert-Butyl methyl ether	121SB	Phosphine in acetylene	133SC	Acetaldehyde
104SB	Ethyl alcohol	111U©	Cumene	121SD	Phosphine	134SA	Trichloroethylene
104SB©	Isopropyl alcohol	111U©	Cyclohexene	121SE	Phosphine	134SB	Trichloroethylene
104SB©	Methyl alcohol	111U©	Decahydronaphthalene	121SG	Phosphine	134SG	Trichloroethylene
104U	Ethyl alcohol	111U©	n-Decane	121SH	Phosphine	135SA	Tetrachloroethylene
105SA	Ammonia	111U©	Diethyl benzene	121SS	Phosphine	135SB	Tetrachloroethylene
105SB	Ammonia	111U©	Ethyl methacrylate	121U	Phosphine	135SG	Tetrachloroethylene
105SC	Ammonia	111U©	Isopropyl ether	121U	Arsine	135SM	Tetrachloroethylene
105SD	Ammonia	111U©	n-Nonane	122SA	Ethylene oxide	136	Acrolein
105SD©	n-Butyl amine	111U©	1,2,4-Trimethyl benzene	122SA©	Furan	137U	Hydrogen
105SD	Cyclohexyl amine	111U©	1,3,5-Trimethyl benzene	122SA©	Isopropyl alcohol	138U	Butyl acetate
105SD©	Di-iso-Propyl amine	111U©	n-Undecane	122SA©	Methyl ethyl ketone	139SB	Methyl ethyl ketone
105SD©	Di-n-Butyl amine	112SA	Hydrogen cyanide	122SA©	Methyl isobutyl ketone	139SB©	Butyl acetate
105SD©	Di-n-Propyl amine	112SB	Hydrogen cyanide	121SC	Ethylene oxide	139SB©	1,4-Dioxane
105SD©	n-Methyl aniline	112SC	Hydrogen cyanide	122SC©	Propylene oxide	139SB©	Isobutyl acetate
105SD©	N,N-Dimethyl aniline	113SA	n-Hexane	122SD	Ethylene oxide	139SB©	Isopropyl acetate
105SD©	Morpholine	113SB	n-Hexane	122SL	Ethylene oxide	139SB©	Propyl acetate
105SD©	Pentyl amine	113SB©	Heptane	122SM	Ethylene oxide	139U	Methyl ethyl ketone
105SD©	Propyl amine	113SB©	Isobutane	123S	Dimethyl ether	139U	Methyl propyl ketone
105SD©	Pyridine	113SB©	Isobutylene	124SA	Toluene	139U©	Diisobutyl ketone
105SD©	o-Toluidine	113SB©	Methyl cyclohexane	124SB	Toluene	139U©	Methyl amyl ketone
105SD©	p-Toluidine	113SB©	Pentane	124SH	Toluene	140SA	Arsine
105SE	Ammonia	113SB©	2,2,4-Trimethyl pentane	125SA	Propane	141SA	Carbon disulphide
105SE©	Trimethyl amine	113SC	n-Hexane	126B	Carbon dioxide	141SB	Carbon disulphide
105SH	Ammonia	114	Bromine	126SA	Carbon dioxide	141SC	Carbon disulphide
105SM	Ammonia	115S	Cyclohexane	126SB	Carbon dioxide	142S	Mercury vapour
106B	Carbon monoxide	116	Chlorine dioxide	126SF	Carbon dioxide	143SA	Xylene
	-in the presence of ethylene	117SA	Nitrogen dioxide	126SG	Carbon dioxide	143SB	Xylene
106C	Carbon monoxide	117SB	Nitrogen dioxide	126SH	Carbon dioxide	145SA	1,2-Dichloroethylene
	-in the presence of ethylene	117SB©	Iodine	126UH	Carbon dioxide	146S	Phosgene
	and/or nitrogen oxides	117SD	Nitrogen dioxide	128SA	Acrylonitrile	147S	Carbon tetrachloride
106S	Carbon monoxide	118SB	Benzene-in the presence of	128SB	Acrylonitrile	150U	Isopropyl alcohol
106SA	Carbon monoxide		other aromatic hydrocarbons	128SC	Acrylonitrile	151U	Propyl acetate
106SC	Carbon monoxide	118SC	Benzene	128SD	Acrylonitrile	152S	Chloroform
106SH	Carbon monoxide	118SD	Benzene	129	Nickel carbonyl	153U	Isobutyl acetate
106SS	Carbon monoxide	118SE	Benzene-in the presence of	130U	tert-Butyl mercaptan	153U©	Naphthalene
106UH	Carbon monoxide		other aromatic hydrocarbons	130U	Ethyl mercaptan	155U	Methyl isobutyl ketone
107SA	Ethyl ether	119LPG	Methanol in LPG	130U	Isopropyl mercaptan	156S	Hydrogen fluoride
107U	Ethyl ether	119SA	Methyl alcohol	130U	Methyl mercaptan	157JS	Methyl bromide

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LIST OF KITAGAWA PRECISION GAS DETECTOR TUBES BY TUBE NO.

Tube No.	Detector Tube Name	Tube No.	Detector Tube Name	Tube No.	Detector Tube Name	Tube No.	Detector Tube Name
157SA	Methyl bromide	181S	Aniline	211U©	Isobutyl acrylate		-separation measurement
157SB	Methyl bromide	182SA	Ozone	213S	Triethyl amine	282S	Hydrogen sulphide • Mercaptans
157SB©	Bromochloromethane	182SB	Ozone	214S	o-Dichlorobenzene		-separation measurement
157SB©	Bromoform	182U	Ozone	215S	p-Dichlorobenzene	290CN	Hydrogen cyanide in blood
157SB©	1-Bromopropane	183U	Cresol	216S	Acetic acid	290CO	Carbon monoxide in blood
157SB©	2-Bromopropane	183U	Phenol	216S	Formic acid	290EA	Ethyl alcohol in blood
157SB©	Dibromomethane	184S	Methyl methacrylate	216S©	Acetic anhydride	290HS	Hydrogen sulphide in blood
157SB©	1,2-Dichloropropane	184S©	Allyl alcohol	216S©	Acrylic acid	290PQ	Paraquat dichloride in blood-qualitative
157SB©	Ethyl bromide	185S	Propylene	216S©	n-Butyric acid	290P	Detector tube for crime investigation
157SD	Methyl bromide	186	Organic gas checker	216S©	Isobutyric acid	290P II	Detector tube for crime investigation
158S	Styrene	186B	Organic gas-qualitative	216S©	Isovaleric acid	301	Air flow indicator tube
158S©	Divinyl benzene	187S	General hydrocarbons	216S©	Maleic anhydride	600SP	Compressed breathing air test (CO)
158S©	α-Pinene	188U	Isopentyl acetate	216S©	Methacrylic acid	601SP	Compressed breathing air test (CO ₂)
158SB	Styrene	189U	2-Butanol	216S©	Propionic acid	602SP	Compressed breathing air test (Oil mist)
159SA	Oxygen	190U	Ethyl cellosolve	216S©	n-Valeric acid	603SPA	Compressed breathing air test (H ₂ O)
159SB	Oxygen	190U	Methyl cellosolve	219S	Hydrazine	604SP	Compressed breathing air test (O ₂)
159SC	Oxygen-Non-heating type	190U©	1-Butanol	221SA	n-Butane	710	Formaldehyde-Indoor air quality
160S	1,1,1-Trichloroethane	190U©	Butyl cellosolve	222S	Diethyl amine	710A	Formaldehyde-Indoor air quality
162U	Tetrahydrofuran	190U©	Crotonaldehyde	222S	Trimethyl amine	713	Formaldehyde-Indoor air quality
163SA	Propylene oxide	190U©	Diacetone alcohol	222S©	Isopropylamine	721	Toluene-Indoor air quality
163SD	Propylene oxide	190U©	Dicyclopentadiene	223S	2,2'-Dichloroethyl ether	721©	Ethyl benzene-Indoor air quality
164SA	Methyl mercaptan	190U©	Ethyl cellosolve acetate	224SA	Monoethanol amine	721©	Xylene-Indoor air quality
164SH	Methyl mercaptan	190U©	Furfural	227S	Dimethyl amine	730	p-Dichlorobenzene-Indoor air quality
165SA	Ethyl mercaptan	190U©	Isoprene	227S	Ethyl amine	730©	1,4-Dichloro-2-butene
165SB	Ethyl mercaptan	190U©	Isopropyl cellosolve	227S	Methyl amine	740	Nitrogen dioxide
165SB	tert-Butyl mercaptan	190U©	Mesityl oxide	229S	N,N-Dimethylacetamide	770	Hydrogen fluoride
166S	Ethylene dibromide	190U©	Methyl cellosolve acetate	230SA	1,2-Dichloroethane	800B	Charcoal tube
167S	Hydrogen selenide	190U©	1-Propanol	232SA	Ethylene glycol	800EC	Charcoal tube
168SA	1,3-Butadiene	190U©	Tetrahydrothiophen	232SB	Ethylene glycol	801	Silica-gel tube
168SB	1,3-Butadiene	192S	Epichlorohydrine	233S	Nitric acid vapour	815H	DNPH sampling cartridge
168SC	1,3-Butadiene	193S	Methyl styrene	234SA	Free residual chlorine	900NH	Ammonia in art galleries/museums
168SE	1,3-Butadiene	194S	1,3-Dichloropropane	235SA	1,1-Dichloroethane	901NHL	Ammonia in clean room
169S	Chloroprene	196S	N,N-Dimethyl formamide	236SA	1,1,2-Trichloroethane	910	Organic acid in art galleries/museums
171SA	Formaldehyde	197U	Cyclohexanone	237S	Vinyl acetate		
171SB	Formaldehyde	197U©	Isophorone	237S©	Methyl butyl ketone		
171SC	Formaldehyde	197U©	1-Methoxy-2-propanol	238S	Furfuryl alcohol		
172S	Chloropicrin	198U	Methyl cyclohexanone	239S	Carbonyl sulphide		
173SA	Hydrogen chloride	199U	Methyl cyclohexanol	240S	Silane		
173SB	Hydrogen chloride	200SA	Sulphide ion	242S	Diborane		
174A	Nitro-oxide compound	200SB	Sulphide ion	242S©	Hydrogen selenide		
174B	Nitro-oxide compound	201SA	Chloride ion	243U	Tetraethoxysilane		
175SA	Nitrogen oxides	201SB	Chloride ion	244U	Sulphuric acid		
175SH	Nitrogen oxides	201SC	Chloride ion	245UH	Methyl isothiocyanate		
175U	Nitrogen oxides	203S	Copper ion	245UL	Methyl isothiocyanate		
176SC	Methyl iodide	204S	Cyanide ion	245UM	Methyl isothiocyanate		
176UH	Methyl iodide	205SL	Salinity	247S	Hydrogen peroxide		
177SA	Water vapour	206U	Cyclohexanol	248U	Ethyl-tert-Butyl Ether		
177U	Water vapour	208U	Isobutyl alcohol	249S	1,3-Dichloropropene		
177UL	Water vapour	209U	Isopentyl alcohol	250S	Dimethyl sulphide		
177UR	Water vapour	210U	Pentyl acetate	251U	Diesel fuel		
178SB	Chlorobenzene	211U	Butyl acrylate	280S	Acetylene • Ethylene		
179S	Ethyl benzene	211U	Methyl acrylate		-separation measurement		
180S	Dichloromethane	211U©	Ethyl acrylate	281S	Oxygen • Carbon dioxide		

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APPLICATIONS OF KITAGAWA GAS DETECTOR TUBE SYSTEM



INDUSTRIAL HYGIENE

Measures harmful gases and vapours quickly in the atmosphere to control the concentration in the work place.



INDUSTRIAL WASTE WATER

Measures effluent simply and quickly to identify the source of pollution anywhere.



PROCESS CONTROL

Measures impurities in gases as raw feedstock and intermediates to ensure high product quality and prevent catalyst poisoning to improve production efficiency.



FIRE/EXPLOSION PREVENTION

Measures mixed combustible gases speedily and safely on-site without ignition source to prevent fire and explosion by leaked or generated gas.



ON BOARD

Measures toxic gas before entering cargo rooms or checks residual gas after cleaning chemical tanks in conformity with the IMO rule.



AIR POLLUTION CONTROL

Measures toxic gases such as SO₂ and NO₂ in flue gas rapidly on-site to identify and control the source of pollutant in the air.



COMBUSTION EFFICIENCY

Measures CO, CO₂ and O₂ in exhaust gas to check combustion efficiency of combustion appliances.



EDUCATION

Measures classroom environment or as an experimental tool for learning combustion and photosynthesis in a science class.



PREVENT ACUTE POISONING

Measures leaked, blowout, generated or residual toxic gases rapidly to prevent poisoning.



DRINK DRIVING CONTROL

Measures alcohol in the breath and contributes to preventing alcohol related accidents.

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●Specifications are subject to change without any prior notice.

