



KITAGAWA

GAS DETECTOR TUBE SYSTEM

An Hygienic Aspirating Pump
With Antibacterial Treatment

Shatterproof
Detector Tubes for
Safety Purposes

- Certified to ISO9001:2000
- Certified to EN1231
- Japan Design Registration No. 1131898
- United States Design Patent No. US D467,334 S

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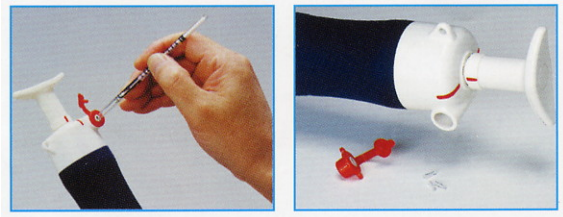
OPERATION OF KITAGAWA GAS DETECTOR TUBE SYSTEM

1. Prepare the aspirating pump.

Check the pump for leaks in accordance with “CHECKING PRIOR TO USE” in the instruction sheet.

2. Cut both ends of the gas detector tube.

Insert the tip of the gas detector tube into the tip cutter and scratch the tip of tube by turning it for one rotation, then pull it towards you. (The glass tip can be thrown away by removing the tip cutter cap.)



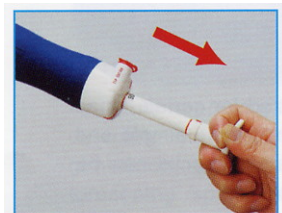
3. Connect the gas detector tube to the aspirating pump.

The sample gas must be drawn through the gas detector tube in the correct direction. Insert the gas detector tube into the rubber tube connector with the tube's directional arrow pointing toward the pump.



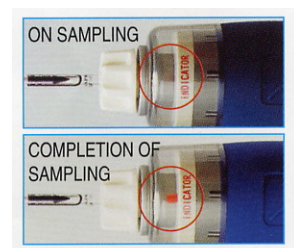
4. Pull the handle.

Align the red line on the bottom case and that on the shaft and pull the pump handle to its full 100ml locking position for 1 pump stroke. If the sampling calls for a half stroke, pull the handle until the 50ml line appears, and shaft will be locked at 50ml.



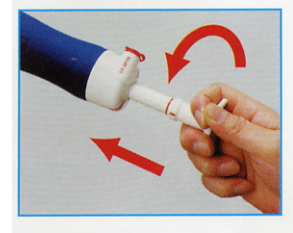
5. Draw sample gas.

Draw the sample gas for the specified time at the described sampling point, and confirm with the flow indicator that the sampling is complete. The sampling time required for each detector tube is stated in the instruction sheet.



6. Return the handle.

When the sampling is complete, turn the handle at a 1/4 turn (90 degrees) clockwise or counter-clockwise to unlock the handle. Confirm that the handle remains extended. (If the handle remains part way, the sampling is incomplete, and this will cause a low reading.)



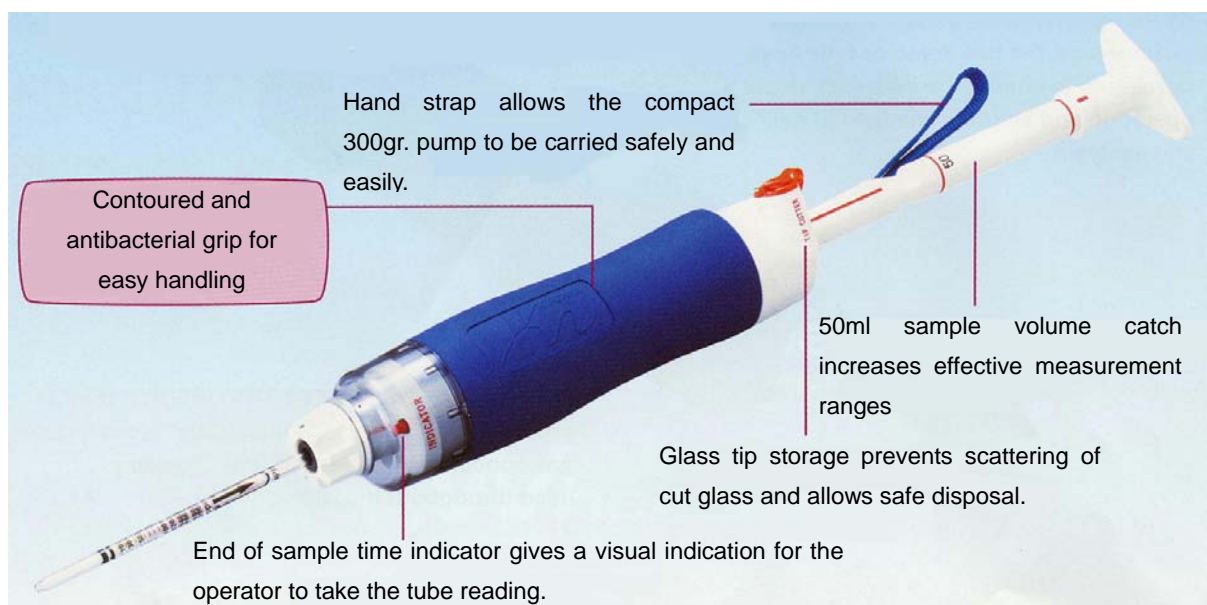
Some detector tubes require more than two strokes. In this case, push back the handle and repeat the operation.

7. Read the concentration.

Remove the gas detector tube from the aspirating pump after the prescribed sample volume has been drawn. Read the concentration of gas at the maximum end of the stain by referring to the printed scale on the detector tube. Some detector tubes require a temperature correction using a table of correction coefficient provided in the instruction sheet.

MODEL AP-20 ASPIRATING PUMP

The AP-20 aspirating pump kit is composed of a carrying case, 2 pieces of the rubber tube connector, 1 piece of grease and an instruction manual.



NOTICES FOR THE LIST OF “KITAGAWA” PRECISION DETECTOR TUBES

Notice 1:

In the case where the gas concentration is read using a conversion chart as shown in the tube instruction sheet, a mark (+) is affixed after the tube number in this brochure, for example: 190U(+). However, this mark (+) is shown only in this brochure and does not appear on the tube box label or in the instruction sheet. When ordering such tubes, it is unnecessary to include the (+) mark on your purchase orders.

Notice 2:

When a constant colour stain is produced, which varies in length according to the concentration of the substance being measured, the reading can be obtained directly from the scale printed on the tube (a direct reading method) or by using the concentration chart provided in each box (a concentration chart method). All tubes suffixed “S” and “U” on the tube number have the direct reading method.

LIST OF KITAGAWA PRECISION DETECTOR TUBES

Gas to be measured (Synonym)	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Acetaldehyde -Concentration chart method	CH ₃ CHO	133A	0.004-1.0%	1	10
Acetaldehyde	CH ₃ CHO	133SB	5-140	2	10
Acetic acid	CH ₃ COOH	216S	1-50	3	10
Acetic anhydride	(CH ₃ CO) ₂ O	216S(+)	1-15	3	10
Acetone	CH ₃ COCH ₃	102SA	0.1-5.0%	3	10
		102SC	0.01-4.0%	1	10
		102SD	20-5,000	2	10
Acetylene	HC≡CH	101S	50-1,000	3	10
Acetylene/Ethylene - separation measurement	HC≡CH, H ₂ C=CH ₂	280S	C ₂ H ₂ :20-300 C ₂ H ₄ :200-2,000	1	2X5
Acrolein (Acryl aldehyde) - Concentration chart method	CH ₂ =CHCHO	136	0.005-1.8%	1	10
Acrylic acid	CH ₂ =CHCOOH	216S(+)	1-50	3	10
Acrylonitrile (Vinyl cyanide)	CH ₂ =CHCN	128SA	0.1-3.5%	3	10
		128SB	10-500	2	10
		128SC	1-120	1	2X5
		128SD	0.2-20	1	2X5
Allyl alcohol	CH ₂ =CHCH ₂ OH	184S(+)	20-500	2	10
Ammonia	NH ₃	105SA	0.5-10%	3	10
		105SB	50-900	3	10
		105SC	5-260	3	10
		105SD	0.2-20	3	10
		105SH	0.5-30%	3	10
		105SM	0.1-1.0%	2	10
Aniline (Aminobenzene)	C ₆ H ₅ NH ₂	181S	1-30	3	10
Arsine	AsH ₃	140SA	5-160	2	10
		121U	0.05-2.0	2	10
Benzene - in presence of gasoline and/or other aromatic hydrocarbons	C ₆ H ₆	118SB	5-200	2	2X5
		118SE	0.2-80	2	2X5
Benzene	C ₆ H ₆	118SC	1-100	2	10
		118SD	0.1-75	2	2X5
Bromine - Concentration chart method	Br ₂	114	1-20	2	10
1,3-Butadiene	CH ₂ =CHCH=CH ₂	168SA	0.03-2.6%	3	10
		168SB	30-600	3	10
		168SC	2.5-100	1	10
n-Butane	CH ₃ (CH ₂) ₂ CH ₃	221SA	0.05-0.6%	3	10
1-Butanol (n-Butyl alcohol)	CH ₃ (CH ₂) ₃ OH	190U(+)	5-100	2	10
2-Butanol (sec-Butyl alcohol)	CH ₃ CH ₂ CH(OH)CH ₃	189U	4-300	2	10
Butyl acetate	CH ₃ CO ₂ C ₄ H ₉	139SB(+)	0.01-1.0%	3	10
		138U	10-400	1	10
Butyl acrylate	CH ₂ =CHCO ₂ C ₄ H ₉	211U	5-60	2	10
Butyl amine	C ₄ H ₉ NH ₂	105SD(+)	1-20	3	10

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Gas to be measured (Synonym)	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Butyl cellosolve (Ethylene glycol monobutyl ether/ 2-Butoxyethanol)	C ₄ H ₉ OCH ₂ CH ₂ OH	190U(+)	10-1,000	2	10
tert-Butyl mercaptan	(CH ₃) ₃ CSH	130U	0.5-10	2	10
Butyric acid	CH ₃ CH ₂ CH ₂ COOH	216S(+)	3-60	3	10
Carbon dioxide - Concentration chart method	CO ₂	126B	0.01-0.7%	2	10
Carbon dioxide	CO ₂	126SA	0.1-5.2%	2	10
		126SB	0.05-1.0%	2	10
		126SF	100-4,000	2	10
		126SG	0.02-1.4%	2	10
		126SH	1-20%	2	10
		126UH	5-50%	2	10
Carbon disulphide	CS ₂	141SA	30-500	2	2X5
		141SB	0.8-50	3	2X5
Carbon monoxide - Concentration chart method	CO	100	5-1,000	3	10
Carbon monoxide - in presence of Ethylene - Colour intensity method	CO	106B	Measurement at 300-30 sec. for 10-1,000	3	10
Carbon monoxide - in presence of Ethylene and NO ₂ - Colour intensity method	CO	106C	Measurement at 300-30 seconds for 10-1,000	2	10
Carbon monoxide	CO	106S	10-250	3	10
		106SA	5-2,000 1-50	3	10
		106SC		1	10
		106SH	0.1%-2.0%	1	10
		106SS	30-500	1.5	10
		106UH	0.1-20%	3	10
Carbon tetrachloride (Tetrachloromethane)	CCl ₄	147S	0.5-60	1	2X5
Carbonyl sulphide	COS	239S	5-60	3	2X5
Chlorine	Cl ₂	109SA	1-40	2	10
		109SB	0.1-10.0	2	10
		109U	0.05-2	2	10
Chlorine dioxide - Concentration chart method	ClO ₂	116	1-20	2	10
Chlorobenzene	C ₆ H ₅ Cl	178SB	1-140	1	2X5
Chloroform (Trichloromethane)	CHCl ₃	152S	23-500	2	2X5
Chloropicrin (Nitrotrichloromethane)	Cl ₃ CNO ₂	172S	0.05-16.0	1	2X5
Chloroprene (2-Chlorobutadiene)	CH ₂ =CClCH=CH ₂	169S	0.5-20	3	2X5
Cresol	C ₆ H ₄ (CH ₃)(OH)	183U	0.5-25.0	2	10
Cyclohexane	C ₆ H ₁₂	115S	0.01-0.6%	3	10
Cyclohexanol	C ₆ H ₁₁ OH	206U	5-500	2	10
Cyclohexanone	C ₆ H ₁₀ O	197U	2-100	3	10
Cyclohexyl amine	C ₆ H ₁₁ NH ₂	105SD(+)	1-20	3	10
Diacetone alcohol (4-Hydroxy-4-methyl-2-pentanone)	(CH ₃) ₂ C(OH)CH ₂ COCH ₃	190U(+)	10-250	2	10

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Gas to be measured (Synonym)	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Diborane	B ₂ H ₆	242S	0.02-5.0	2	10
Dibutyl amine	(C ₄ H ₉) ₂ NH	105SD(+)	2-20	3	10
o-Dichlorobenzene	C ₆ H ₄ Cl ₂	214S	5-100	2	10
p-Dichlorobenzene	C ₆ H ₄ Cl ₂	215S	10-150	1	10
1,1-Dichloroethane (Ethylidene dichloride)	CH ₃ CHCl ₂	235S	10-160	1	2X5
1,2-Dichloroethane (Ethylidene dichloride)	ClCH ₂ CH ₂ Cl	230S	5-50	1	2X5
2,2-Dichloroethyl ether	(ClCH ₂ CH ₂) ₂ O	223S	2-30	1	2X5
1,2-Dichloroethylene (Acetylene dichloride)	ClCH=CHCl	145S	5-400	1	2X5
Dichloromethane (Methylene chloride)	CH ₂ Cl ₂	180S	10-1,000	2	2X5
1,3-Dichloropropane	ClCH ₂ CH ₂ CH ₂ Cl	194S	10-500	1	2X5
Diethyl amine	(C ₂ H ₅) ₂ NH	222S	1-20	3	10
Diethyl ether (Ethyl ether)	C ₂ H ₅ OC ₂ H ₅	107SA 107U	0.04-1.4% 20-40	3 2	10 10
Diisopropyl amine	[(CH ₃) ₂ CH] ₂ NH	105SD(+)	1-16	3	10
N,N-Dimethyl acetamide	CH ₃ CON(CH ₃) ₂	229S	5-70	1	10
Dimethyl amine	(CH ₃) ₂ NH	227S	1-20	3	10
N,N-Dimethyl aniline	C ₆ H ₅ N(CH ₃) ₂	105SD(+)	0.5-9	3	10
N,N-Dimethyl formamide	HCON(CH ₃) ₂	196S	1-30	2	10
Dimethyl ether	CH ₃ OCH ₃	123S	0.01-1.2%	3	10
1,4-Dioxane	C ₄ H ₈ O ₂	139SB(+) 119U(+)	0.05-2.5% 20-500	3 2	10 10
Dipropyl amine	[CH ₃ (CH ₂) ₂] ₂ NH	105SD(+)	1-14	3	10
Epichlorohydrine (1-Chloro,2,3-epoxy-propane)	OCH ₂ CHCH ₂ Cl	192S	5-50	1	2X5
Ethyl acetate	CH ₃ CO ₂ C ₂ H ₅	111SA 111U	0.1-5.0% 10-1000	3 2	10 10
Ethyl acrylate	CH ₂ =CHCO ₂ C ₂ H ₅	211U(+)	5-60	2	10
Ethyl alcohol (Ethanol)	C ₂ H ₅ OH	104SA	0.05-5.0%	3	10
Ethyl amine	C ₂ H ₅ NH ₂	227S	1-20	3	10
Ethyl benzene	C ₆ H ₅ C ₂ H ₅	179S	10-500	1.5	10
Ethyl cellosolve (Ethylene glycol monoethyl ether) (2-Ethoxyethanol)	C ₂ H ₅ OCH ₂ CH ₂ OH	190U	5-500	2	10
Ethyl cellosolve acetate (Ethylene glycol ethyl ether acetate)	C ₂ H ₅ OC ₂ H ₄ OCOCH ₃	190U(+)	50-150	2	10
Ethylene -colour intensity	H ₂ C=CH ₂	108B	0.1-100	3	10
Ethylene -high range	H ₂ C=CH ₂	108SA	20-1,200	2	10
Ethylene dibromide (1,2-Dibromoethane)	BrCH ₂ CH ₂ Br	166S	1-50	1	2X5
Ethylene glycol (Monoethylene glycol)	HOCH ₂ CH ₂ OH	232SA 232SB	20-250mg/m ³ 3-40mg/m ³	2 2	2X5 2X5
Ethylene oxide	CH ₂ CH ₂ O	122SA 122SM 122SC 122SD	0.01-4% 5-100 1-15 0.1-14.0	3 3 2 1	10 10 2X5 2X5

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Gas to be measured (Synonym)	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Ethyl mercaptan (Ethanethiol)	C ₂ H ₅ SH	165SA	1-160	2	10
		165SB	2.5-80	2	10
		130U	0.5-10	2	10
Formaldehyde	HCHO	171SA	20-1,500	2	2X5
		171SB	1-35	3	2X5
		171SC	0.05-4.0	1	10
Formic acid	HCOOH	216S	1-50	3	10
Furan (Furfuran)	C ₄ H ₄ O	122SA(+)	0.01-2.0%	3	10
Furfural (2-Furaldehyde)	C ₅ H ₄ O ₂	190U(+)	2-60	2	10
Furfuryl alcohol	C ₄ H ₃ OCH ₂ OH	238S	2-25	1	10
Gasoline (Petrol)	C _n H _m	110S	0.05-0.6%	3	10
General hydrocarbons Mineral turpentine	HC	187S	50-1,400 as n-Hexane	2	10
Heptane	CH ₃ (CH ₂) ₅ CH ₃	113SB(+)	100-2,000	2	10
n-Hexane	CH ₃ (CH ₂) ₄ CH ₃	113SA	0.05-1.32%	3	10
		113SB	50-1,400	2	10
		113SC	5-800	2	10
Hydrazine (Amidrazone)	NH ₂ NH ₂	219S	0.05-10	1	10
Hydrogen	H ₂	137U	0.05-0.8%	3	5
Hydrogen chloride	HCl	173SA	20-1,200	2	2X5
		173SB	0.4-40	3	2X5
Hydrogen cyanide	HCN	112SA	0.01-3.0%	3	10
		112SB	0.5-100	2	10
		112SC	0.3-8	1	2X5
Hydrogen fluoride	HF	156S	0.17-30	3	10
Hydrogen peroxide	H ₂ O ₂	247S	0.5-10.0	3	10
Hydrogen selenide	H ₂ Se	167S	1-600	1	10
Hydrogen sulphide	H ₂ S	120SB	0.75-300	3	10
		120SC	0.005-0.16%	3	10
		120SD	1-60	3	10
		120SE	0.5-40	2	10
		120SF	25-2000	3	10
		120SH	0.1-4.0%	3	10
		120SM	0.05-1.2%	2	10
		120U	0.2-6.0	2	10
		120UH	2-20%	3	10
120UT	2.5-40%	3	10		
Hydrogen sulphide and Mercaptans - separation measurement	H ₂ S & R.SH	282S	H ₂ S: 1-30 R.SH: 0.5-5	2	2X5
Isobutane	(CH ₃) ₃ CH	113SB(+)	50-1,200	2	10
Isobutyl acetate	CH ₃ CO ₂ CH ₂ CH(CH ₃) ₂	139SB(+)	0.01-1.4%	3	10
		153U	10-400	1	10
Isobutyl acrylate	CH ₂ =CHCO ₂ CH ₂ CH(CH ₃) ₂	211U(+)	5-60	2	10
Isobutyl alcohol (Isobutanol)	(CH ₃) ₂ CHCH ₂ OH	208U	5-100	2	10
Isobutylene	(CH ₃) ₂ C=CH ₂	113SB(+)	0.03-2.0%	2	10

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Gas to be measured (Synonym)	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Isobutyric acid	CH ₃ CH ₂ CH ₂ COOH	216S(+)	3-50	3	10
Isopentyl acetate (Isoamyl acetate)	CH ₃ CO ₂ (CH ₂) ₂ CH(CH ₃) ₂	188U	10-400	1	10
Isopentyl alcohol (Isoamyl alcohol)	(CH ₃) ₂ CH(CH ₂) ₂ OH	209U	5-100	2	10
Isoprene	CH ₂ =C(CH ₃)CH=CH ₂	190U(+)	1-16	2	10
Isopropyl acetate		139SB(+)	0.01-1.2%	3	10
		111U	10-1,000	2	10
Isopropyl alcohol (2-Propanol)	CH ₃ CH(OH)CH ₃	122SA(+)	0.05-2.5%	3	10
		150U	20-1,200	2	10
Isopropyl mercaptan	(CH ₃) ₂ CHSH	130U	0.5-10	2	10
Isovaleric acid	(CH ₃) ₂ CHCH ₂ CO ₂ H	216S(+)	3-50	3	10
Maleic anhydride	C ₄ H ₂ O ₃	216S(+)	0.2-10	3	10
Mercury vapour	Hg	142S	0.1-10mg/m ³	3	10
Mesityl oxide (4-Methyl-3-penten-2-one)	CH ₃ COCH=C(CH ₃) ₂	190U(+)	5-100	2	10
Methacrylic acid	CH ₂ =C(CH ₃)COOH	216S(+)	1-50	3	10
Methyl acetate	CH ₃ CO ₂ CH ₃	111SA(+)	0.1-3.0%	3	10
Methyl acrylate	CH ₂ =CHCO ₂ CH ₃	211U	5-60	2	10
Methyl alcohol (Methanol)	CH ₃ OH	119SA	0.05-6.0%	3	10
		119U	20-1,000	2	10
Methyl amine	CH ₃ NH ₂	227S	1-20	3	10
n-Methyl aniline	C ₆ H ₅ NHCH ₃	105SD(+)	0.5-6.0	3	10
Methyl bromide (Bromomethane)	CH ₃ Br	157SA	10-500	3	2X5
		157SB	0.4-80	3	2X5
Methyl cellosolve (Ethylene glycol monomethyl ether) (2-Methoxyethanol)	CH ₃ OCH ₂ CH ₂ OH	190U	5-500	2	10
Methyl chloroform (1,1,1-Trichloroethane)	CH ₃ CCl ₃	160S	15-400	3	2X5
Methyl cyclohexane	C ₆ H ₁₁ CH ₃	113SB(+)	100-1,600	2	10
Methyl cyclohexanol	CH ₃ C ₆ H ₁₀ OH	199U	5-200	2	10
Methyl cyclohexanone	CH ₃ C ₆ H ₉ O	198U	2-100	2	10
Methyl ethyl ketone		122SA(+)	0.05-5.0%	3	10
		139SB	0.01-1.4%	3	10
		139U	20-1,500	2	10
Methyl iodide (Iodomethane)	CH ₃ I	176S	2-40	2/3	2X5
Methyl isobutyl ketone (Isopropyl acetone)	CH ₃ COCH ₂ CH(CH ₃) ₂	122SA(+)	0.01-0.6%	3	10
		155U	5-300	2	10
Methyl mercaptan (Methanethiol)	CH ₃ SH	130U	0.5-10	2	10
		164SA	5-140	2	10
		164SH	50-1,000	3	10
Methyl methacrylate	CH ₂ =C(CH ₃)CO ₂ CH ₃	184S	10-160	2	10
Methyl styrene	CH ₃ C ₆ H ₄ CH=CH ₃	193S	10-500	3	10
Monoethanol amine (2-Aminoethanol)	H ₂ NCH ₂ CH ₂ OH	224SA	0.5-50	2	10
Morpholine	C ₄ H ₉ NO	105SD(+)	2-22	3	10
Naphthalene	C ₁₀ H ₈	153U(+)	10-100	1	10

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Gas to be measured (Synonym)	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Nickel carbonyl (Nickel tetracarbonyl) - Concentration chart method	Ni(CO) ₄	129	20-700	1/2	10
Nitric acid vapour	HNO ₃	233S	1-20	1	10
Nitrogen dioxide	NO ₂	117SA	20-1,000	3	10
		117SB	0.5-30.0	1	10
		117SD	0.1-1.0	1.5	2X5
Nitrogen oxide and dioxide - separation measurement - Concentration chart method	NO & NO ₂	174A	NO: 10-300	2	5
		174B	NO ₂ : 1-40	2	2X5
Nitrogen oxides	NO+NO ₂	175SA	20-250	1	10
		175U	0.5-30	3	10
		175SH	100-2,500	2	10
Organic gas checker	C _n H _m	186	-	2	10
Oxygen	O ₂	159SA	2-24%	2	5
		159SB	2-24%	2	5
Oxygen - Non-heating type	O ₂	159SC	1.5-24%	2	2X5
Oxygen/Carbon dioxide - separation measurement	O ₂ & CO ₂	281S	O ₂ : 2-10% CO ₂ : 1-20%	1.5	2X5
Ozone	O ₃	182SA	50-1,000	2	10
		182SB	2.5-100	2	10
		182U	0.025-3.0	2	10
Pentane	CH ₃ (CH ₂) ₃ CH ₃	113SB(+)	50-1,000	2	10
Pentyl acetate (Amyl acetate)	CH ₃ CO ₂ (CH ₂) ₄ CH ₃	210U	10-200	2	10
Pentyl amine	CH ₃ (CH ₂) ₃ CH ₂ NH ₂	105SD(+)	2-22	3	10
Phenol	C ₆ H ₅ OH	183U	0.5-25.0	2	10
Phosgene (Carbonyl chloride)	COCl ₂	146S	0.1-20	1	10
Phosphine in Acetylene - Use with an orifice.	PH ₃	121SA	20-800	3	10
		121SB	5-90	3	10
Phosphine	PH ₃	121SC	20-1,400	3	10
		121SD	0.25-20.0	1	10
		121SH	100-3,200	3	10
		121U	0.05-2.0	2	10
Propane	C ₃ H ₈	125SA	0.02-0.5%	2	10
Propionic acid	CH ₃ CH ₂ COOH	216S(+)	3-50	3	10
Propyl acetate	CH ₃ CO ₂ (CH ₂) ₂ CH ₃	139SB(+)	0.01-1.4%	3	10
		151U	20-1000	2	10
Propyl amine	CH ₃ CH ₂ CH ₂ NH ₂	105SD(+)	1-20	3	10
Propylene	CH ₂ =CHCH ₃	185S	50-1,000	2	10
Propylene oxide (1,2-Epoxypropane)	CH ₃ CHCH ₂ O	163SA	0.05-5.0%	3	10
n-Propyl mercaptan	CH ₃ CH ₂ CH ₂ SH	130U	0.5-10	2	10
Pyridine	C ₅ H ₅ N	105SD(+)	0.5-10	3	10
Silane	SiH ₄	240S	0.5-50	1	10
Styrene (Vinyl benzene)	C ₆ H ₅ CH=CH ₂	158S	2.5-300	3	10
		158SB	1-100	3	2X5

LIST OF KITAGAWA PRECISION DETECTOR TUBES

Gas to be measured (Synonym)	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Sulphur dioxide	SO ₂	103SA	0.1-3.0%	3	10
		103SB	0.02-0.3%	3	10
		103SC	20-300	2	10
		103SD	1-60	3	10
		103SE	0.25-10	1	10
Sulphur dioxide - in flue gas	SO ₂	103SF	0.02-0.3%	3	2X5
Sulphuric acid	H ₂ SO ₄	244U	0.5-5mg/m ³	2	10
Tetrachloroethylene (Perchloroethylene)	Cl ₂ C=CCl ₂	135SA	5-300	2	10
		135SB	0.2-10	1	10
		135SH	0.05-2.0%	2	2X5
Tetraethoxysilane	Si(OC ₂ H ₅) ₄	243U	5-200	3	10
Tetrahydrofuran	(CH ₂) ₄ O	102SA(+)	0.2-5.0%	3	10
		162U	20-400	2	10
Toluene (Methyl benzene)	C ₆ H ₅ CH ₃	124SA	10-500	3	10
		124SB	2-100	3	10
		124SH	100-3,000	2	10
o-Toluidine	C ₆ H ₄ (CH ₃)(NH ₂)	105SD(+)	2-22	3	10
p-Toluidine	C ₆ H ₄ (CH ₃)(NH ₂)	105SD(+)	2-20	3	10
1,1,2-Trichloroethane	Cl ₂ CHCH ₂ Cl	236S	10-100	1	2X5
Trichloroethylene	Cl ₂ C=CHCl	134SA	5-300	2	10
		134SB	0.2-36.8	1	10
		134SH	0.05-2.0%	2	10
Triethyl amine	(C ₂ H ₅) ₃ N	213S	1-20	3	10
Trimethyl amine	(CH ₃) ₃ N	222S	1-20	3	10
1,2,4-Trimethyl benzene	C ₆ H ₃ (CH ₃) ₃	111U(+)	20-250	2	10
2,2,4-Trimethyl pentane	(CH ₃) ₃ CCH ₂ CH(CH ₃) ₂	113SB(+)	100-4,000	2	10
n-Valeric acid	CH ₃ (CH ₂) ₃ CO ₂ H	216S(+)	3-70	3	10
Vinyl acetate	CH ₃ CO ₂ CH=CH ₂	237S	5-120	2	10
Vinyl chloride (Chloroethylene)	CH ₂ =CHCl	132SA	0.05-1.0%	3	10
		132SB	5-500	1.5	2X5
		132SC	0.1-12.0	3	2X5
Water vapour	H ₂ O	177SA	1.7-33.8mg/l	3	10
		177U	0.05-2.0mg/l	3	10
		177UL	3-80LB/MMCF	3	10
		177UR	2-12LB/MMCF	3	10
Xylene (Dimethyl benzene)	C ₆ H ₄ (CH ₃) ₂	143SA	5-1,000	1.5	10
		143SB	5-200	2	10

LIST OF KITAGAWA PRECISION DETECTOR TUBES

** SPECIAL DETECTOR TUBES **

QUALITATIVE-ANALYSIS DETECTOR TUBES

No. 131 Inorganic gas qualitative detector tube (10 tubes per box)

Gas to be detected: NH₃, SO₂, HCl, Acetic Acid, CO, Acetylene, Amines, Cl₂, NO₂, H₂S, PH₃, Methyl mercaptan

No. 186B Organic gas qualitative detector tube (10 tubes per box for 5-time use)

Gas to be detected: Hexane, Propane, Butane, Pentane, Heptane, 1,1,1-Trichloroethane, Trichloroethylene, Tetrachloroethylene, Vinyl chloride, Ethylene, Butadiene, Acetylene, Gasoline, Kerosine, Benzene, Acetone, Methyl ethyl ketone, Methyl isobutyl ketone, Formaldehyde, Acetaldehyde, Ethyl acetate, Butyl acetate, Ethylene oxide, Methyl mercaptan, Toluene, Ethyl benzene, Xylene, Styrene, Methyl alcohol, 1-Butanol, Isopropyl alcohol, Ethyl cellosolve, Tetrahydrofuran, CS₂, Phenol, Cresol, Aniline, Ethyl amine, Arsine, H₂S, CO

COMPRESSED BREATHING AIR TEST TUBES

Gas to be measured (Synonym)	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Carbon monoxide	CO	600SP	5-100	2	10
Carbon dioxide	CO ₂	601SP	100-3,000	2	10
Oil mist		602SP	0.5-5mg/m ³	2	10
Water vapour	H ₂ O	603SPA	20-160mg/m ³	3	10
Oxygen	O ₂	604SP	2-24%	2	10

Note 1. One meter of vinyl tubing is required when using 604SP.

2. Model P-41R compressed breathing air sampling kit is available for use with these tubes.

DETECTOR TUBES USED FOR DISSOLVED SUBSTANCES IN SOLUTION

Substance to be measured	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Sulphide ion	S ₂ ⁻	200SA	2-1,000	1	10
		200SB	0.5-10	2	10
Chloride ion	Cl	201SA	10-2,000	3	10
		201SB	3-200	2	10
Iron ion	Fe ₃ ⁺	202	50-400	1	10
Copper ion	Cu ₂ ⁺	203S	1-10mg/l	1	10
Cyanide ion	CN	204S	0.2-5	2	10
Salinity	NaCl	205SL	0.01-0.8%	2	10
Free residual chlorine	Cl ₂	234SA	0.4-5	2	10

INDOOR AIR POLLUTANTS MEASUREMENT DETECTOR TUBES

Gas to be measured	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Formaldehyde	HCHO	710	0.01-1.20	1	20
		710A	0.05-2.0	1	20
Toluene	C ₆ H ₅ CH ₃	721	0.05-1.0	1	2X10
p-Dichlorobenzene	p-C ₆ H ₄ Cl ₂	730	0.01-0.40	1	2X10

Note: Model S-23E or S-25N Air Sampler is required for above tubes.

LIST OF KITAGAWA PRECISION DETECTOR TUBES

TIME WEIGHTED AVERAGE TUBES

Gas to be measured	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Carbon monoxide	CO	500	5-400	3	10
Ammonia	NH ₃	501	5-200	3	10
Hydrogen Sulphide	H ₂ S	502	1-20	1	10
Sulphur dioxide	SO ₂	503	0.5-20	3	10
Toluene	C ₆ H ₅ CH ₃	504	20-200	3	10

SUPER-HIGH SENSITIVITY DETECTOR TUBES FOR AMMONIA IN ART GALLERIES/MUSEUMS AND CLEAN ROOMS

Gas to be measured	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Ammonia	NH ₃	900NHH	10-80 mg/m ³	2	10
		900NHL	1-12 mg/m ³	2	10

Note: Model S-23E or S-25N Air Sampler is required for above tubes.

SPECIAL APPLICATION TUBES

Name of Detector Tube	Chemical Formula	Tube No.	Measuring Range (ppm)	Shelf Life (year)	Quantity of Tubes in Box
Crime investigation (Kerosene/Gasoline discrimination)		290PII		1	10
Hydrogen cyanide in blood	HCN	290CN	2-30mg/l	2	2X5
Carbon monoxide in blood	COHb	290CO	20-90%COHb	1.5	2X5
Ethyl alcohol in blood	C ₂ H ₅ OH	290EA	0.2-2.0mg/ml	5/6	2X5
Paraquat dichloride in blood -qualitative	CH ₃ (C ₅ H ₄ N) ₂ CH ₃ Cl ₂	290PQ		3	10

SAMPLE COLLECTION TUBES

No. 800B Charcoal tube (20 tubes per box) - Confirmed to NIOSH requirements

- Useful for sampling organic solvent vapour in air with a personal sampler for industrial hygiene
- Two sections system with 100mg + 50mg

No. 801 Silica-gel tube (10 tubes per box)

- Useful for sampling polar solvent vapours, which cannot be collected by Charcoal tubes such as Methanol
- One section system of 300mg silica-gel with Breakthrough indicator

SPECIAL APPARATUS AND ACCESSORIES

Model SH-5N/SH-10N Rubber Extension Hose

Available in 5 meters of SH-5N and 10 meters of SH-10N length for remote sampling with aspirating pump Model AP-20. Useful for drawing samples from inaccessible and confined areas such as manholes, sumps, ship holds, warehouse, tanks, etc.



Model SR-200R Extension Sampling Rod

Used with aspirating pump Model AP-20 for gas detection vertically and horizontally unreachable positions of up to 2 meters.



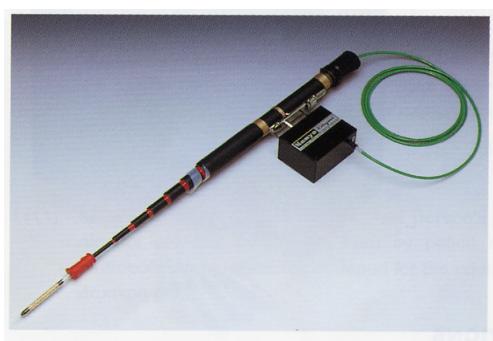
Model AS-1/AS-2 Air Flow Indicator

To determine velocity and direction of air flow, Model AS-1 is for spot tests and Model AS-2 is for continuous measurement with No.300 Air flow Indicator tube (10 tubes/box).



Model AS-3 Extension Air Flow Indicator

Consists of dry batteries and a pump attached on the handle of the extension rod for continuous air flow check up to 2 meters. (Non-explosion proof type)



Model SA-10 One-hand operation switch

In case of operations on a ladder, high places, narrow space, one-hand sampling is possible by pressing down the switch knob. (In case of use with AP-20, an additional adaptor is required.)



Model B-191 Tip Cutter

Tip cutter of detector tubes, which prevents scattering and accumulated pieces can be checked through a clear body.



Model SF-40 Hot-air probe

Where hot sample is measured like emission gas from gas fittings or automobiles, this probe at 40cm in length is available.



Model SS-100 100ml Glass Syringe

This is useful for the measurement of high temperature gas or for diluting high concentration gas.



Model SPG-1 Sampling Probe for gases in Soil

Chlorinated organic solvents in soil can be measured by using the probe at 1m in length. A digging tool to make a hole in soil is additionally necessary.

Applicable detector tubes:

No. 134SA, No. 134SB
Trichloroethylene

No. 135SA, No. 135SB
Tetrachloroethylene

No. 160S
Methyl chloroform



Model P-10FG Flue Gas Sampler

Composed of a ribbon heater, stainless steel sampling probe, suction pump, Model AP-20 aspirating pump and carrying case.

Applicable detector tubes:

No. 174B (NO & NO₂)
No. 175SA (NO_x)
No. 175SH (NO_x)
No. 103SF (SO₂)
No. 106SA (CO)
No. 126SH (CO₂)
No. 173SA (HCl)
No. 159SC (O₂)



Model S-23E Air Sampler

Useful for No. 700 series tubes and No. 900 series tubes. Semi-portable type with AC220V operation and approx. 4kg in weight. Sampling at 1,000 to 1,050mm in height is possible by connecting a detector tube into the extension rod provided.



Model S-25N Air Sampler

Useful for No. 700 series tubes and No. 900 series tubes. Portable type with dry battery operation and approx. 680g in weight.



NUMERICAL INDEX OF KITAGAWA DETECTOR TUBES

Tube No.	Detector Tube	Tube No.	Detector Tube	Tube No.	Detector Tube
100	Carbon monoxide	113SB	n-Hexane	126UH	Carbon dioxide
101S	Acetylene	113SB(+)	Isobutane	128SA	Acrylonitrile
102SA	Acetone	113SB(+)	Isobutylene	128SB	Acrylonitrile
102SA(+)	Tetrahydrofuran	113SB(+)	Methyl cyclohexane	128SC	Acrylonitrile
102SC	Acetone	113SB(+)	2,2,4-Trimethyl pentane	128SD	Acrylonitrile
102SD	Acetone	113SB(+)	Heptane	129	Nickel carbonyl
103SA	Sulphur dioxide	113SB(+)	Pentane	130U	tert-Butyl mercaptan
103SB	Sulphur dioxide	113SC	n-Hexane	130U	Ethyl mercaptan
103SC	Sulphur dioxide	114	Bromine	130U	Isopropyl mercaptan
103SD	Sulphur dioxide	115S	Cyclohexane	130U	Methyl mercaptan
103SE	Sulphur dioxide	116	Chlorine dioxide	130U	n-Propyl mercaptan
103SF	Sulphur dioxide	117SA	Nitrogen dioxide	131	Inorganic gas qualitative
104SA	Ethyl alcohol	117SB	Nitrogen dioxide	132SA	Vinyl chloride
105SA	Ammonia	117SD	Nitrogen dioxide	132SB	Vinyl chloride
105SB	Ammonia	118SB	Benzene	132SC	Vinyl chloride
105SC	Ammonia	118SC	Benzene	133A	Acetaldehyde
105SD	Ammonia	118SD	Benzene	133SB	Acetaldehyde
105SD(+)	Butyl amine	118SE	Benzene	134SA	Trichloroethylene
105SD(+)	Cyclohexyl amine	119SA	Methyl alcohol	134SB	Trichloroethylene
105SD(+)	Dibutyl amine	119U	Methyl alcohol	134SH	Trichloroethylene
105SD(+)	Diisopropyl amine	119U(+)	1,4-Dioxane	135SA	Tetrachloroethylene
105SD(+)	N,N-Dimethyl aniline	120SB	Hydrogen sulphide	135SB	Tetrachloroethylene
105SD(+)	Dipropyl amine	120SC	Hydrogen sulphide	135SH	Tetrachloroethylene
105SD(+)	n-Methyl aniline	120SD	Hydrogen sulphide	136	Acrolein
105SD(+)	Morpholine	120SE	Hydrogen sulphide	137U	Hydrogen
105SD(+)	Pentyl amine	120SF	Hydrogen sulphide	138U	Butyl acetate
105SD(+)	Propyl amine	120SH	Hydrogen sulphide	139SB	Methyl ethyl ketone
105SD(+)	Pyridine	120SM	Hydrogen sulphide	139SB(+)	Butyl acetate
105SD(+)	o-Toluidine	120U	Hydrogen sulphide	139SB(+)	1,4-Dioxane
105SD(+)	p-Toluidine	120UH	Hydrogen sulphide	139SB(+)	Isobutyl acetate
105SH	Ammonia	120UT	Hydrogen sulphide	139SB(+)	Isopropyl acetate
105SM	Ammonia	121SA	Phosphine in Acetylene	139SB(+)	Propyl acetate
106B	Carbon monoxide	121SB	Phosphine in Acetylene	139U	Methyl ethyl ketone
106C	Carbon monoxide	121SC	Phosphine	140SA	Arsine
106S	Carbon monoxide	121SD	Phosphine	141SA	Carbon disulphide
106SA	Carbon monoxide	121SH	Phosphine	141SB	Carbon disulphide
106SC	Carbon monoxide	121U	Phosphine	142S	Mercury vapour
106SH	Carbon monoxide	121U	Arsine	143SA	Xylene
106SS	Carbon monoxide	122SA	Ethylene oxide	143SB	Xylene
106UH	Carbon monoxide	122SA(+)	Furan	145S	1,2-Dichloroethylene
107SA	Diethyl ether	122SA(+)	Isopropyl alcohol	146S	Phosgene
107U	Diethyl ether	122SA(+)	Methyl ethyl ketone	147S	Carbon tetrachloride
108B	Ethylene	122SA(+)	Methyl isobutyl ketone	150U	Isopropyl alcohol
108SA	Ethylene	122SC	Ethylene oxide	151U	Propyl acetate
109SA	Chlorine	122SD	Ethylene oxide	152S	Chloroform
109SB	Chlorine	122SM	Ethylene oxide	153U	Isobutyl acetate
109U	Chlorine	123S	Dimethyl ether	153U(+)	Naphthalene
110S	Gasoline	124SA	Toluene	155U	Methyl isobutyl ketone
111SA	Ethyl acetate	124SB	Toluene	156S	Hydrogen fluoride
111SA(+)	Methyl acetate	124SH	Toluene	157SA	Methyl bromide
111U	Ethyl acetate	125SA	Propane	157SB	Methyl bromide
111U	Isopropylacetate	126B	Carbon dioxide	158S	Styrene
111U(+)	1,2,4-Trimethyl benzene	126SA	Carbon dioxide	158SB	Styrene
112SA	Hydrogen cyanide	126SB	Carbon dioxide	159SA	Oxygen
112SB	Hydrogen cyanide	126SF	Carbon dioxide	159SB	Oxygen
112SC	Hydrogen cyanide	126SG	Carbon dioxide	159SC	Oxygen
113SA	n-Hexane	126SH	Carbon dioxide	160S	Methyl chloroform
162U	Tetrahydrofuran	190U(+)	Butyl cellosolve	224SA	Monoethanol amine

NUMERICAL INDEX OF KITAGAWA DETECTOR TUBES

Tube No.	Detector Tube	Tube No.	Detector Tube	Tube No.	Detector Tube
163SA	Propylene oxide	190U(+)	Diacetone alcohol	227S	Dimethyl amine
164SA	Methyl mercaptan	190U(+)	Ethyl cellosolve acetate	227S	Ethyl amine
164SH	Methyl mercaptan	190U(+)	Furfural	227S	Methyl amine
165SA	Ethyl mercaptan	190U(+)	Isoprene	229S	N,N-Dimethylacetamide
165SB	Ethyl mercaptan	190U(+)	Mesityl oxide	230S	1,2-Dichloroethane
166S	Ethylene dibromide	192S	Epichlorohydrine	232SA	Ethylene glycol
167S	Hydrogen selenide	193S	Methyl styrene	232SB	Ethylene glycol
168SA	1,3-Butadiene	194S	1,3-Dichloropropane	233S	Nitric acid vapour
168SB	1,4-Butadiene	196S	N,N-Dimethyl formamide	234SA	Free residual chloride
168SC	1,5-Butadiene	197U	Cyclohexanone	235S	1,1-Dichloroethane
169S	Chloroprene	198U	Methyl cyclohexanone	236S	1,1,2-Trichloroethane
171SA	Formaldehyde	199U	Methyl cyclohexanol	237S	Vinyl acetate
171SB	Formaldehyde	200SA	Sulphide ion	238S	Furfuryl alcohol
171SC	Formaldehyde	200SB	Sulphide ion	239S	Carbonyl sulphide
172S	Chloropicrin	201SA	Chloride ion	240S	Silane
173SA	Hydrogen chloride	201SB	Chloride ion	242S	Diborane
173SB	Hydrogen chloride	202	Iron ion	243U	Tetraethoxysilane
174A	NO & NO2	203S	Copper ion	244U	Sulphuric acid
174B	NO & NO3	204S	Cyanide ion	247S	Hydrogen peroxide
175SA	Nitrogen oxides	205SL	Salinity	280S	Acetylene & Ethylene
175SH	Nitrogen oxides	206U	Cyclohexanol	281S	O2 & CO2
175U	Nitrogen oxides	208U	Isobutyl alcohol	282S	H2S & Mercaptans
176S	Methyl iodide	209U	Isopentyl alcohol	290CN	HCN in blood
177SA	Water vapour	210U	Pentyl acetate	290CO	CO in blood
177U	Water vapour	211U	Butyl acrylate	290EA	Ethanol in blood
177UL	Water vapour	211U	Methyl acrylate	290PII	Light mineral oils
177UR	Water vapour	211U(+)	Ethyl acrylate	290PQ	Paraquat in blood
178SB	Chlorobenzene	211U(+)	Isobutyl acrylate	300	Air flow indicator tube
179S	Ethyl benzene	213S	Triethyl amine	500	TWA-CO
180S	Dichloromethane	214S	o-Dichlorobenzene	501	TWA-Ammonia
181S	Aniline	215S	p-Dichlorobenzene	502	TWA-H2S
182SA	Ozone	216S	Acetic acid	503	TWA-SO2
182SB	Ozone	216S	Formic acid	504	TWA-Toluene
182U	Ozone	216S(+)	Acetic anhydride	600SP	CO in compressed air
183U	Cresol	216S(+)	Acrylic acid	601SP	CO2 in compressed air
183U	Phenol	216S(+)	Butyric acid	602SP	Oil mist in compressed air
184S	Methyl methacrylate	216S(+)	Isobutyric acid	603SP	H2O in compressed air
184S(+)	Allyl alcohol	216S(+)	Isovaleric acid	604SP	O2 in compressed air
185S	Propylene	216S(+)	Maleic anhydride	710	Formaldehyde
186	Organic gas checker	216S(+)	Methacrylic acid	710A	Formaldehyde
186B	Organic gas qualitative	216S(+)	Propionic acid	721	Toluene
187S	General hydrocarbons	216S(+)	n-Valeric acid	730	p-Dichlorobenzene
188U	Isopentyl acetate	219S	Hydrazine	800B	Charcoal tube
189U	2-Butanol	221SA	n-Butane	801	Silica-gel tube
190U	Ethyl cellosolve	222S	Diethyl amine	900NHH	Ammonia
190U	Methyl cellosolve	222S	Trimethyl amine	900NHL	Ammonia
190U(+)	1-Butanol	223S	2,2-Dichloroethyl ether		

Mark (+) after the tube number means a conversion chart type. Specifications are subject to change without prior notice.



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