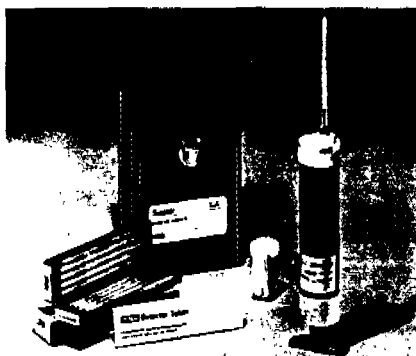


Detectors, Reagents, and Accessories for Samplair™ Pump and Testing Kit.

Also for Universal Test r.



Using the Samplair Pump with appropriate tubes, filter paper and reagent kits, some 140 toxic gases, vapors, and mists in the threshold limit ranges can be detected.

MSA® detector tubes are regularly submitted for certification by National Institute for Occupational Safety and Health. The tubes which at the time this list was printed have been certified by NIOSH as meeting the requirements of 42 CFR Part 84 when used with these pumps, are indicated by "NIOSH" and Testing & Certification number following the listed detectable hazard. The tubes are a direct-reading type. Those tubes calibrated for a single compound have the concentration scale printed on the tube for direct reading. Multiple-use tubes have a millimeter scale printed on the tube and concentrations are determined from a table supplied with the

package. Tubes are supplied in packages of ten.

Note: Shelf life of Detector Tubes and Reagent Kits, minimum of 30 months after packaging.

For information on the Samplair Pump, Model A, see Data Sheet 08-02-02.

Key

Ⓐ Refers to Threshold Limit Values as established by the American Conference of Governmental Industrial Hygienists—1980. (TLVs refer to time-weighted-average concentrations for a 7- or 8-hr workday and 40-hr work-week.) Threshold Limit Values are reviewed annually by the Conference. For current TLV data, contact: Secretary-Treasurer, American Conference of Governmental Industrial Hygienists, P.O. Box 1937, Cincinnati, Ohio 45201.

Ⓑ Interferences and temperature correction data shown on individual instruction sheets.

Ⓒ Also order #81316 Package of Pre-Filter Discs to remove interfering H₂S and SO₂ (if present). A pre-filter effectively absorbs these gases in concentrations up to 100 ppm.

Ⓓ Also order #58238 Pinch Clamp (necessary to restrict contents of reactor tube).

Ⓔ Also order #82389 Vial of Charcoal (required for filling filter retainer of Accessory Kit to protect Sampling

Pump from reagent vapors and/or droplets).

Ⓔ Order Sample Conditioning Kit #87028. When measuring CO content of flue gases or in presence of NO₂ in concentrations from 7 to 100 ppm, also order #73139 Gasorbent Refill (sufficient for 10 refills of Sample Conditioning Kit "prescrubber").

Ⓕ If remote sampling is desired, also order a sampling line of the desired length:

- #73067 Sampling Line, 10 ft long
- #73068 Sampling Line, 25 ft long
- #73069 Sampling Line, 50 ft long

Note: when sampling point is remote from pump, detector tube should be placed in remote end of sampling line.

Ⓖ If desired, a gas-sampling collecting kit is available for measuring the mercaptan content of a sample taken from a natural gas line. Order #454500 Gas-Sample Collecting Kit.

Ⓙ Accessory Kit #87030 required for detecting Chromic Acid Mist, Decaborane, Diborane, Lead Dust/Fume, and Pentaborane. Accessory Kit #87031 required for Arsine, Phosphine, and Stibine.

Ⓚ Requires adapter (#467063) when using Samplair Pump.

Ⓛ Flue Gas Test Kit #470321 is available for reducing sample temperature (max. 1000° F) to less than 125° F.

Detector, Reagents, Accessories for Universal Tester and Samplair Pumps and Testing Kits

Ⓐ DENOTES TRADENAME

() TLV FIGURES IN PARENTHESES ARE 1980 PROPOSED

Detectable Hazard	Measurable Range (PPM)	Ⓐ 1980 ACGIH TLVs (PPM)	Ⓕ Pkg of Detector Tubes	Reagent Kit	Box of Filter Papers	Required Pyrolyzer	Ⓑ Interferences
Acetaldehyde	25–1000	100	93963				Turpentine, other Aldehydes
Acetic Acid	0–50	10	460022				SO ₂
Acetone	NIOSH (TC-84-54) 125–6500	(750)	460423				Ethanol
Acetonitrile	10–200	40	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Acetylene	3–600		82802				Ammonia, H ₂ S, CO, Hydrocarbons
Acrylonitrile	1–150	(2)	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
	10–400	25	92115				Acid gases & other Amines
Ammonia	NIOSH (TC-84-034) 5–1600	25	460103				Acid gases & other Amines
n-Amyl alcohol (pentanol 1)	25–2000		95097				Other Alcohols
sec-Amyl alcohol (pentanol 2)	25–2000		95097				Other Alcohols
tert.-Amyl alcohol (2 methyl-butanol 2)	25–2000		95097				Other Alcohols
n-Amyl mercaptan (pentanethiol – 1)	0.5–100		454206 Ⓐ				H ₂ S

*DENOTES TRADENAME

() TLV FIGURES IN PARENTHESES ARE 1980 PROPOSED

Detectable Hazard	Measurable Range (PPM)	(A) 1980 ACGIH TLVs (PPM)	(B) Pkg of Detector Tubes	Reagent Kit	Box of Filter Papers	Required Pyrolyzer	(C) Interferences
Arsine (1) (K)	0.025 - 1.0	0.05		81101 (E)	81220 (C)		Stibine, Phosphine
Benzene	5 - 200	10	93074				Aromatic, Aliphatic Hydrocarbons
	0 - 150	10	467050				Aromatic, Aliphatic Hydrocarbons
Bromine	5 - 175	0.1	82399				H ₂ S, NH ₃ , NO ₂ , Ethylene, Halides
Bromobenzene (Mono)	10 - 800		93074				Aromatic, Aliphatic Hydrocarbons
Butadiene (1, 3-butadiene)	100 - 4000	1000	93962				
2-Butoxyethanol (butyl Cellosolve*)	30 - 900	(25)	95097				Other Alcohols
n-Butyl alcohol (butanol 1)	50 - 4000	50	95097				Other Alcohols
sec-Butyl alcohol (butanol 2)	50 - 4000	(100)	95097				Other Alcohols
tert-Butyl alcohol (2 methyl propanol 2)	100 - 1000	100	95097				Other Alcohols
n-Butylamine	2 - 100	5	92115				Acid gases
Butyl mercaptan (butanethiol-1)	0.5 - 100	0.5	454206 (1)				H ₂ S
tert-Butyl mercaptan (2-methyl propanethiol-2)	0.5 - 100		454206 (1)				H ₂ S
Carbon dioxide NIOSH (TC-84-025)	200 - 120,000	5000	85976				
Carbon disulfide	0 - 100	10	463527				
	NBS Color Change (E)	10 - 1000	50	47134			NO ₂ , Ethylene, Acetylene
Carbon monoxide	5 - 3000	50	91229 (1)				Hydrogen, H ₂ S, Acetylene
	NIOSH (TC-84-067)	0 - 3000	50	465519 (1)			Hydrogen, H ₂ S, Acetylene
	10 - 200	(5)	88536			460325	Other Halogen Compounds & Halogens
Carbon tetrachloride	0 - 70	(5)	460548			460325	Other Halogen Compounds & Halogens
	0.5 - 100	1	82399				H ₂ S, NH ₃ , NO ₂ , Ethylene, Halides
Chlorine NIOSH (TC-84-042)	0.1 - 25	1	460225				H ₂ S, NH ₃ , NO ₂ , Ethylene, Halides
Chlorine dioxide	0.05 - 16	0.1	82399				H ₂ S, NH ₃ , NO ₂ , Ethylene, Halides
	10 - 200	75	85834 (B)				Other Halogen Compounds & Halogens
Chlorobenzene (Monochlorobenzene)	10 - 800	75	93074				Aromatic, Aliphatic Hydrocarbons
	50 - 400	200	85834 (B)				Other Halogen Compounds & Halogens
Chlorobromomethane	25 - 500	200	88536			460325	Other Halogen Compounds & Halogens
	100 - 4000		88536			460325	Other Halogen Compounds & Halogens
1-Chloro-1, 1-difluoroethane (Genetron® 142B)	100 - 2500		92030			460325	HNO ₃ , Hydrocarbons
Chlorodifluoromethane (Freon® 22)	200 - 2000	1000	88536			460325	Other Halogen Compounds & Halogens
Chloroform (trichloromethane)	25 - 400	10	88536			460325	Other Halogen Compounds & Halogens
1-Chloro-1-nitropropane	2 - 75	(2)	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Chloropentafluoroethane (Freon® 115)	200 - 2000		88536			460325	Other Halogen Compounds & Halogens
	250 - 2500		88536			460325	Other Halogen Compounds & Halogens
Chlorotrifluoromethane (Freon® 13)	200 - 3500		92030			460325	HNO ₃ , Hydrocarbons
Chromic acid mist (1) (K)	0.05 - 1.4 mg/m ³	0.1		79014 (E)	79010		
Cumene	0 - 1000	50	460422				Butyl Mercaptan & Unsaturated Hydrocarbons
Cyanogen	2 - 100	10	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Cyclohexanol	25 - 1000	50	95097				Other Alcohols
Cyclohexylamine	5 - 100	10	92115				Acid gases
Decaborane (1) (K)	0.01 - 1.0	0.05		82099 (E)	82388		Hydrazine, UDMH, H ₂ S
Diborane (1) (K)	0.1 - 3.0	0.1		82099 (E)	82388		Hydrazine, UDMH, H ₂ S
	10 - 200	20	88536			460325	Other Halogen Compounds & Halogens
1,2-Dibromoethane (ethylene dibromide)	5 - 100	20	85834 (B)				Other Halogen Compounds & Halogens
O-Dichlorobenzene	10 - 200	50	85834 (B)				Other Halogen Compounds & Halogens
Dichlorodifluoromethane (Freon® 12)	25 - 3000	1000	88536			460325	Other Halogen Compounds & Halogens
1,1-Dichloroethane	25 - 400	200	85834 (B)				Other Halogen Compounds & Halogens
1,2-Dichloroethane	25 - 400	10	85834 (B)				Other Halogen Compounds & Halogens
	10 - 300	200	85834 (B)				Other Halogen Compounds & Halogens
Dichloroethylene (CIS-1,2)	100 - 500	200	88536			460325	Other Halogen Compounds & Halogens
	50 - 400	200	85834 (B)				Other Halogen Compounds & Halogens
Dichloroethylene (trans-1,2)	25 - 1000	200	92030			460325	HNO ₃ , Hydrocarbons
Dichloroethyl ether	5 - 75	5	85834 (B)				Other Halogen Compounds & Halogens
1,1-Dichloro-1-nitroethane	2 - 75	2	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Dichlorotetrafluoroethane (Freon® 114)	200 - 2000	1000	88536			460325	Other Halogen Compounds & Halogens
Diethylamine	10 - 200	3	92115				Acid gases

3M 115073

Detectable Hazard	Measurable Range (PPM)	(A) 1980 ACGIH TLVs (PPM)	(B) Pkg of Detector Tubes	Reagent Kit	Box of Filter Papers	Required Pyrolyzer	(C) Interferences
Diethyl sulfate	5-50		95300				
Dimethyl acetamide	5-80	10	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Dimethylamine	5-100	10	92115				Acid gases
Dimethylformamide	5-150	10	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Dimethyl sulfate	1-50	0.1	95300				
Dimethyl sulfoxide	10-250		95739			460325	SO ₂ , Organic Sulfur Compounds
Di-n-propylamine	5-100		92115				Acid gases
2-Ethoxyethanol	50-1000	(50)	95097				Other Alcohols
Ethyl alcohol (ethanol)	200-10,000	1000	95097				Other Alcohols
Ethylamine	10-300	10	92115				Acid gases
Ethyl benzene	10-500	100	463202				Aromatic, Aliphatic Hydrocarbons
Ethyl bromide	25-400	200	85834 (B)				Other Halogen Compounds & Halogens
Ethyl Chloride	100-2000	1000	85834 (B)				Other Halogen Compounds & Halogens
	100-2000	1000	92030			460325	HNO ₃ , Hydrocarbons
Ethylene	0.5-100		82802				NH ₃ , H ₂ S, CO, Hydrocarbons
Ethylene dichloride	25-450	10	92030			460325	HNO ₃ , Hydrocarbons
1,2-Dichloroethane NIOSH (TC-84-058)	0-600	10	461863 (B)				Other Halogen Compounds & Halogens
Ethylenimine	2-100	0.5	92115				Acid gases
Ethyl mercaptan	0.5-100	0.5	454206 (1)				H ₂ S
N-Ethylmorpholine	5-100	5	92115				Acid gases
Fluorotrichloromethane (Freon® 11)	250-2000	1000	88536			460325	Other Halogen Compounds & Halogens
	250-2000	1000	92030			460325	HNO ₃ , Hydrocarbons
Formaldehyde	1-100	2	93963				Turpentine, other Aldehydes
Furfuryl alcohol	25-500	10	95097				Other Alcohols
Hexane	25-5000	50	463838				Aliphatic and some Aromatic Hydrocarbons
Hydrazine	0.5-40	0.1	460425				Acid gases & other Amines
Hydrogen chloride	0-300	5	91636				HNO ₃
	2-170	5	466612				HNO ₃
Hydrogen cyanide	0-80	10	93262				Ammonia, H ₂ S
Hydrogen fluoride	0-25	3	462019				
Hydrogen sulfide NIOSH (TC-84-022)	1-1000	10	460058				SO ₂
	10-2000	10	463875				SO ₂
Isoamyl alcohol (2 methyl-butanol 4)	50-1000	100	95097				Other Alcohols
Isobutyl alcohol (2 methyl propanol)	50-4000	50	95097				Other Alcohols
Isopropylamine	5-100	5	92115				Acid gases
Lead Dust/Fume (1) (K)	0.05-6.3 mg/m ³	0.15 mg/m ³		78399 (1)	78693		
Mercury, except alkyl	0.05-2.0 mg/m ³	0.05 mg/m ³	83089				
Methacrylonitrile	10-80		91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Methyl alcohol (methanol)	100-10,000	200	95097				Other Alcohols
Methylamine	10-100	10	92115				Acid gases
Methyl bromide	10-100	(5)	85834 (B)				Other Halogen Compounds & Halogens
	2.5-90	(5)	462135				Other Halogen Compounds & Halogens
	10-100	(5)	88536			460325	Other Halogen Compounds & Halogens
Methyl chloride	25-1000	(50)	92030			460325	HNO ₃ , Hydrocarbons
Methyl chloroform (1,1,1-trichloroethane)	100-700	350	88536			460325	Other Halogen Compounds & Halogens
Methylcyclohexanol	25-800	50	95097				Other Alcohols
Methylene chloride (dichloromethane)	100-2000	(100)	85834 (B)				Other Halogen Compounds & Halogens
	0-3000	(100)	462516				Other Halogen Compounds & Halogens
	100-1000	(100)	88536			460325	Other Halogen Compounds & Halogens
	50-2000	(100)	92030			460325	HNO ₃ , Hydrocarbons
Methyl isobutyl carbinol	25-1000	25	95097				Other Alcohols
Methyl mercaptan	0.5-100	0.5	454206 (1)				H ₂ S
Monomethyl hydrazine	0.5-50	0.2	460425				Acid gases & other Amines
Nitric oxide NIOSH (TC-84-059)	1-150	25	460424				H ₂ S & Halogens
Nitrogen dioxide NIOSH (TC-84-040)	0-30	(3)	83099				H ₂ S, Halides
Nitroethane	10-300	100	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds

3M 115074

Detectable Hazard		Measurable Range (PPM)	Ⓐ 1980 ACGIH TLVs (PPM)	Ⓡ Pkg of Detector Tubes	Reagent Kit	Box of Filter Papers	Required Pyrolyzer	Ⓢ Interferences
Nitromethane		5—300	100	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
1-Nitropropane		2—100	(15)	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
2-Nitropropane		5—150	25	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Ozone		0.05—5.0	0.1	93865				NO ₂ , SO ₂
Pentaborane Ⓢ Ⓡ		0.01—1.0	0.005		82099 Ⓢ	82388		Hydrazine, UDMH, H ₂ S
Perchloroethylene	NIOSH (TC-84-065)	25—350	50	85834 Ⓢ				Other Halogen Compounds & Halogen
		0—800	50	460467				Other Halogen Compounds & Halogen
		25—400	50	88536			460325	Other Halogen Compounds & Halogen
Phosgene (carbonyl chloride)		0.1—10	0.1	89890				
Phosphine Ⓢ Ⓡ		0.025—1.0	0.3		81101 Ⓢ	81220 Ⓢ		Arsine, Stibine
Propyl alcohol (propanol-1)		100—10,000	200	95097				Other Alcohols
iso-Propyl alcohol (propanol-2)		100—10,000	400	95097				Other Alcohols
n-Propyl mercaptan (propanethiol-1)		0.5—100		454206 Ⓢ				H ₂ S
n-Propyl nitrate		10—100	25	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Propylene		1—400		82802				NH ₃ , H ₂ S, CO, Hydrocarbons
Propylene dichloride (1,2-dichloropropane)		25—250	75	85834 Ⓢ				Other Halogen Compounds & Halogens
		25—500	75	92030			460325	HNO ₃ , Hydrocarbons
Propylene imine		2—300	2	92115				Acid gases
Pyridine		2—50	5	91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Stibine Ⓢ Ⓡ		0.025—1.0	0.1		81101 Ⓢ	81220 Ⓢ		Arsine, Phosphine
Styrene, monomer (phenylethylene)		0—500	(50)	461781				
Sulfur dioxide	NIOSH (TC-84-046)	1—400	2	92623				Acetic Acid
1,1,2,2-Tetrabromoethane		2—50		85834 Ⓢ				Other Halogen Compounds & Halogens
1,1,2,2-Tetrachloroethane		2—50	1	85834 Ⓢ				Other Halogen Compounds & Halogens
1,1,3,3-Tetrachloropropene		5—100		85834 Ⓢ				Other Halogen Compounds & Halogens
Toluene (toluol)	NIOSH (TC-84-057)	12.5—700	100	461371				Aromatic, Aliphatic Hydrocarbons
		10—800	100	93074				Aromatic, Aliphatic Hydrocarbons
1,1,2-Trichloroethane (beta)		25—700	10	85834 Ⓢ				Other Halogen Compounds & Halogens
		50—500	10	88536			460325	Other Halogen Compounds & Halogens
Trichloroethylene	NIOSH (TC-84-055)	50—600	(50)	85834 Ⓢ				Other Halogen Compounds & Halogens
		25—600	(50)	460328				Other Halogen Compounds & Halogens
		25—400	(50)	88536			460325	Other Halogen Compounds & Halogens
1,2,3-Trichloropropane		10—500	50	85834 Ⓢ				Other Halogen Compounds & Halogens
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon® 113)		100—2000	1000	88536			460325	Other Halogen Compounds & Halogens
		100—4000	1000	92030			460325	HNO ₃ , Hydrocarbons
Triethylamine		5—100	25	92115				Acid gases
Trifluoromonobromomethane (Freon® 13B1)		100—4000	1000	88536			460325	Other Halogen Compounds & Halogens
Trimethylamine		5—200		92115				Acid gases
Unsymmetrical Dimethylhydrazine		0.5—50	0.5	460425				Acid gases & other Amines
Vinyl chloride (chloroethylene)		25—250	5	85834 Ⓢ				Other Halogen Compounds & Halogens
		0—100	5	462534				HNO ₃ , Hydrocarbons
		100—2000	5	92030			460325	HNO ₃ , Hydrocarbons
Vinylidene chloride		10—300	10	85834 Ⓢ				Other Halogen Compounds & Halogens
Vinyl pyridine		1—100		91624			460325	H ₂ S, Halogen, Nitrogen & Hydrocarbon Compounds
Xylene (o-, m-, p-isomers)		10—500	100	463201				Aromatic, Aliphatic Hydrocarbons
Xylene		10—800	100	93074				Aromatic, Aliphatic Hydrocarbons

Note: This Data Sheet contains a general description of certain detectors, reagents and accessories for use with the Universal Tester™ and Samplair Pumps from MSA and includes a list of representative hazards that can be detected; however, under no circumstances should the products be used except by qualified, trained personnel and not until the instructions, labels, or other literature accompanying them have been carefully read and understood and the precautions therein set forth followed. Only they contain the complete and detailed information concerning these products.



600 Penn Center Boulevard
Pittsburgh, Pa. 15235 USA
Phone (412) 273-5000 • Telex 812453

Worldwide service: Branch offices throughout the United States.
Subsidiaries in: Amsterdam • Barcelona • Berlin • Calcutta • Glasgow
Johannesburg • Lima • Mexico City • Milan • Ndola • Paris • Salisbury
Santiago • São Paulo • Singapore • Sydney • Tokyo • Toronto.
Representatives in principal cities throughout the world