



## FEATURES

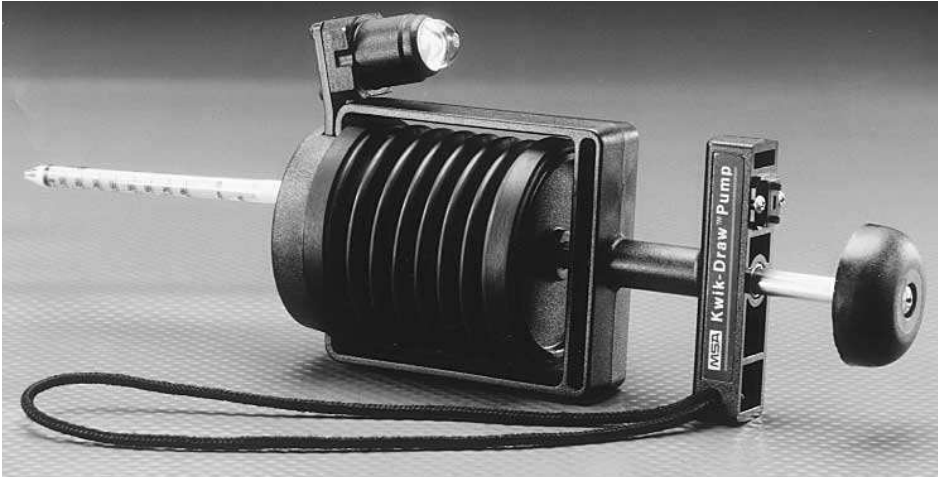
- Quick and inexpensive to use.
- A reliable method of testing more than 170 hazardous gases and vapors.
- Kwik-Draw Deluxe and Gas Tester II pumps offer automatic stroke counters and unique end-of-stroke indicators.
- Tubes are printed with easy-to-read scales.
- Specialized kits are available for use in HazMat work and indoor air quality testing.
- Toximeter II Automatic Detector Tube Pump allows presetting of up to 250 pump strokes and "hands-free" automatic operation.

## DESCRIPTION

MSA's detector tube pumps can be used with an assortment of MSA detector tubes to spot-test the atmosphere for a wide variety of toxic substances.

MSA's Kwik-Draw Pumps are designed for one-hand operation and consistent delivery of a sample draw volume of 100 milliliters (ml). The pumps are constructed with a shaft-guided compression system for more consistent and replicable flow rate and volume per stroke than may be available with hand-guided pumps.

## PUMPS



*Kwik-Draw® Detector Tube Pump*



*End-of-stroke indicator on Deluxe Model.*



*Mechanical stroke counter on both models.*



*Gas Tester™ II Detector Tube Pump*



*Toximeter™ II Automatic Detector Tube Pump*

### **Kwik-Draw® Detector Tube Pumps**

Kwik-Draw Pumps allow detection of gases and vapors with the squeeze of a handle. To obtain a precise (100 ml) sample volume, the user simply grasps the hand grip and pushes the knob. The pump's compression system provides the guiding action to drive a spring-loaded bellows pump.

An integral, easy-to-read stroke counter shows the exact number of strokes performed and provides a positive stop when the stroke is fully compressed.

A second model, the Kwik-Draw Deluxe Pump, has a unique end-of-stroke indicator that "winks" after the precise volume of air is drawn, confirming that enough air has been sampled for a successful reading.

### **Gas Tester™ II Detector Tube Pump**

The Gas-Tester II H Pump is set for action by compressing the bellows. A pump stroke is started by pressing the release button. When the sample (100ml) is drawn through the tube, the

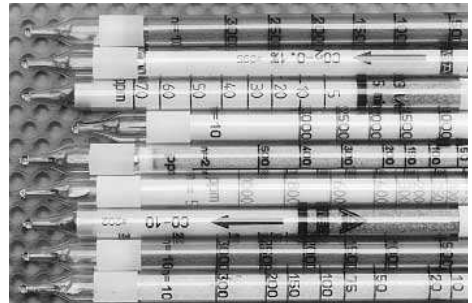
end-of-stroke indicator changes color. An accurate measurement is obtained because the sample draw procedure itself is controlled only by the specifications of the pump and the flow resistance of the detector tube.

### **Toximeter™ II Automatic Detector Tube Pump**

The Toximeter II Automatic Detector Tube Pump makes the sampling process easier, allowing the user to preset the number of pump strokes (from 1 to 250 pump strokes). Intrinsically safe, the automatic pump works with all MSA detector tubes. It can also be used as a sampling pump. For more information, see Data Sheet No. 08-01-02.

Part No.	Description
487500	Kwik-Draw Deluxe Detector Tube Pump, with end-of-stroke indicator, remote sampling adapter and carrying pouch
488543	Kwik-Draw Basic Detector Tube Pump, with remote sampling adapter and carrying pouch
696944	Gas-Tester II H Pump
655585	Toximeter II Automatic Detector Tube Pump

## DETECTOR TUBES



MSA/Auer detector tubes are made of glass, have break-off tips, and are filled with treated chemical granules for sampling a variety of substances. Most MSA/Auer detector tubes are packaged 10 per box.

For ordering information, see Detector Tube Summary Chart, which begins on page 3. The summary chart lists chemical substances, including threshold limit values, and the appropriate MSA detector tube for each, including part number and measurable range capabilities.

## Detector Tube Summary Chart

Substance measured	Detector Tube applicable	Part No. (one package of 10 tubes)	Measuring range	Threshold Limit value 1998 ACGIH (ppm)
Acetaldehyde	Formaldehyde-0.1	497649	5-50	25 (ceiling)
Acetic Acid	Acetic Acid-1	804138	1-80	10
Acetone	Acetone-100	804141	100-10,000	500
	Qualitest QL	497665	n/a	
Acetylene dichloride, cis and trans (1,2 Dichloroethylene)	Trichloroethane-5	487343	10-500	200
	Qualitest QL	497665	n/a	
Acetylene tetrabromide (1,1,2,2-Tetrabromoethane)	Trichloroethane-5	487343	5-200	1
	Qualitest QL	497665	n/a	
Acetylene tetrachloride (1,1,2,2-Tetrachloroethane)	Trichloroethane-5	487343	50-1000	1
	Qualitest QL	497665	n/a	
Ammonia	NH3-2	804405	2-500	25
	NH3-20	800300	20-1000	
	NH3-0.1%	804406	0.1-10 Vol.-%	
n-Amyl chloride (1-Chloropentane)	Trichloroethane-5	487343	5-550	-
Benzene	Aromatic HC	804132	5-500	.5
	C6H6-1	807024	0.5-25	
	C6H6-5	804411	5-100	
	Qualitest QL	497665	n/a	
	C6H6-0.5	655837*	0.5-10	
Bromine	C12-0.2	803944	0.2-3	0.1
Bromobenzene	Aromatic HC	804132	30-720	-
Bromoethane (Ethyl bromide)	Trichloroethane-5	487343	15-400	5
Bromoform (Tribromomethane)	Trichloroethane-5	487343	7-200	0.5
Bromomethane (Methyl bromide)	Trichloroethane-5	487343	20-270	1
1,3-Butadiene	Ethylene-50	804428	100-1200	2
	Qualitest QL	497665	n/a	
n-Butane	Propane-200	804418	200-3800	800
	Qualitest QL	497665	n/a	
n-Butanol (Butyl Alcohol)	Ethanol-100	804136	100-3900	50 (ceiling)
sec. Butanol (sec-Butyl Alcohol)	Ethanol-100	804136	300-5100	100
1-Butene (1-Butylene)	Ethylene-50	804428	100-5000	-
	Qualitest QL	497665	n/a	
2-Butylene, cis and trans (2-Butylene)	Ethylene-50	804428	200-5000	-
	Qualitest QL	497665	n/a	
Butyl Alcohol (n-Butanol)	Ethanol-100	804136	100-3900	50 (ceiling)
sec-Butyl Alcohol (sec-Butanol)	Ethanol-100	804136	300-5100	100
n-Butylamine	Triethylamine-5	804134	2-28	5 (ceiling)
iso-Butylamine	Triethylamine-5	804134	3-36	-
sec-Butylamine	Triethylamine-5	804134	2-18	-
t-Butylamine	Triethylamine-5	804134	2-14	-
n-Butylchloride (1-Chlorobutane)	Trichloroethane-5	487343	5-170	-
	Qualitest QL	497665	n/a	
1-Butylene (1-Butene)	Ethylene-50	804428	100-5000	-
	Qualitest QL	497665	n/a	
2-Butylene (2-Butene, cis and trans)	Ethylene-50	804428	200-5000	-
	Qualitest QL	497665	n/a	
n-Butyl mercaptan	Ethylmercaptan-0.5	804589	1.5-15	0.5
t-Butyl mercaptan	Ethylmercaptan-0.5	804589	0.8-5	-
Carbon Dioxide	CO2-100	497606	100-3000	5000
	CO2-0.1%	487333	0.1-7.0 Vol.-%	
	CO2-1%	804419	1-20 Vol.-%	
Carbon Disulfide	CS2-2	492514	2-300	10
	Qualitest QL	497665	n/a	

\* includes scrubber tubes for Benzene specificity

Substance measured	Detector Tube applicable	Part No. (one package of 10 tubes)	Measuring range	Threshold Limit value 1998 ACGIH (ppm)
Carbon Monoxide	CO-0.001 %	804421	0.001–0.3 Vol.-%	25
	CO-5	803943	5–1000	
	CO-10	487334	10–3000	
	CO-3000	815507	3000–70000	
	CO-0.1%	804423	0.1–1.0 Vol.-%	
	CO-0.3%	487335	0.3–7.0 Vol.-%	
	CO-10/color (special orifice assembly for CO-10/color)	47134 497652	10–1000	
Chlorine	CI2-0.2	803944	0.2–30	0.5
	ClO2-0.05	804133	1–46	
	Cl2-50	655862	50–500	
Chlorine dioxide	ClO2-0.05	804133	0.05–15	0.1
Chlorobenzene	Aromatic HC	804132	40–610	10
Chlorobromomethane	Trichloroethane-5	487343	5–180	200
1-Chlorobutane (n-Butylchloride)	Trichloroethane-5	487343	5–170	–
	Qualitest QL	497665	n/a	
Chloroethane(Ethyl chloride)	Trichloroethane-5	487343	50–800	100
Chloroethylene (Vinyl chloride)	VC-1	803950	1–70	5
	Trichloroethane-5	487343	20–550	
Chloroform (Trichloromethane)	Trichloroethane-5	487343	8–100	10
1-Chloropentane (n-Amylchloride)	Trichloroethane-5	487343	5–550	–
1-Chloropropane (1-Propylchloride)	Trichloroethane-5	487343	5–220	–
2-Chloropropane (2-Propylchloride)	Trichloroethane-5	487343	8–1700	–
Cycloheptane	Hexane-20	497664	80–3300	–
Cyclohexane	Hexane-20	497664	20–3400	300
	Qualitest QL	497665	n/a	
Cyclohexylamine	Triethylamine-5	804134	7–38	10
Cyclooctane	Hexane-20	497664	20–2100	–
Cyclopentane	Hexane-20	497664	80–2700	600
n-Decane	Hexane-20	497664	50–500	–
1,2-Dibromoethane (Ethylene dibromide)	Trichloroethane-5	487343	25–700	–
Dibromomethane (Methylene dibromide)	Trichloroethane-5	487343	9–200	–
1,1-Dichloroethane (Ethylidene chloride)	Trichloroethane-5	487343	8–300	100
1,2-Dichloroethane (Ethylene dichloride)	CH2Cl2-50	804416	30–720	10
1,1-Dichloroethylene (Vinylidene chloride)	Trichloroethane-5	487343	10–600	5
1,2-Dichloroethylene (Acetylene dichloride, cis and trans)	Trichloroethane-5	487343	10–500	200
Dichloromethane (Methylene chloride)	CH2Cl2-50	804416	50–1000	50
1,2-Dichloropropane (Propylene dichloride)	Trichloroethane-5	487343	5–440	75
1,3-Dichloropropane (Trimethylene dichloride)	Trichloroethane-5	487343	5–220	–
Diesel Oil	Qualitest QL	497665	n/a	–
Diethylamine	Triethylamine-5	804134	3–27	5
Dimethylamine	Triethylamine-5	804134	3–27	5
2,2-Dimethylbutane	Hexane-20	497664	100–4900	–
Ethanol (Ethyl Alcohol)	Ethanol-100	804136	100–6000	1000
	Qualitest QL	497665	n/a	
Ethene (Ethylene)	Ethylene-50	804428	25–5000	–
	Qualitest QL	497665	n/a	

Substance measured	Detector Tube applicable	Part No. (one package of 10 tubes)	Measuring range	Threshold Limit value 1998 ACGIH (ppm)
Ethyl Alcohol (Ethanol)	Ethanol-100 Qualitest QL	804136 497665	100–6000 n/a	1000
Ethylamine	Triethylamine-5	804134	4–55	5
Ethyl benzene	Tol.-5	803947	5–1800	100
Ethyl bromide (Bromoethane)	Trichloroethane-5	487343	15–400	5
Ethyl chloride (Chloroethane)	Trichloroethane-5	487343	50–8000	100
Ethylene (Ethene)	Ethylene-50 Qualitest QL	804428 497665	25–5000 n/a	–
Ethylenediamine	Triethylamine-5	804134	5–27	10
Ethylene dibromide (1,2-Dibromoethane)	Trichloroethane-5	487343	25–700	–
Ethylene dichloride (1,2-Dichloroethane)	CH <sub>2</sub> Cl <sub>2</sub> -50	804416	30–720	10
Ethylidene chloride (1,1-Dichloroethane)	Trichloroethane-5	487343	8–300	100
Ethyl mercaptan	Ethylmercaptan-0.5	804589	0.5–80	0.5
Formaldehyde	Formaldehyde-0.1	497649	0.1–55	0.3 (ceiling)
Formic Acid	Qualitest QL Acetic Acid-1	497665 804138	n/a 2–160	5
Furfuryl alcohol	Phenol-1	813778	on request	10
Gasoline	Gasoline-30 Qualitest QL	492870 497665	30–6000 n/a	300
n-Heptane	Hexane-20	497664	20–2600	400
n-Hexane	Hexane-20	497664	20–3200	50
Hydrogen Chloride	HCl-1 Qualitest QL	803948 497665	1–30 n/a	5 (ceiling)
Hydrogen Cyanide	HCN-2	803945	2–50	4.7 (ceiling)
Hydrogen Fluoride	HF-1	804142	1–50	3 (ceiling)
Hydrogen Sulfide	H <sub>2</sub> S-1 H <sub>2</sub> S-100 H <sub>2</sub> S-0.1% Qualitest QL	487339 487340 655932 497665	1–200 100–4000 0.1–4 Vol. % n/a	10
Isobutane (Methylpropane)	Propane-200	804418	200–4200	–
Isobutanol (Isobutyl Alcohol, 2-Methylpropyl Alcohol)	Ethanol-100	804136	100–2900	50
Isobutene (Isobutylene, Methylpropene)	Ethylene-50	804428	400–2600	–
iso-Butylamine	Triethylamine-5	804134	3–36	–
Isobutylene (Isobutene, Methylpropene)	Ethylene-50	804428	400–2600	–
Isobutyl Alcohol (Isobutanol, 2-Methylpropyl Alcohol)	Ethanol-100	804136	150–2900	50
Isobutyl Methyl Ketone	MEK-50	813334	50–6500	–
Iso Octane	Hexane-20	497664	100–3000	–
Isopropanol (Isopropyl Alcohol, 2-Propanol)	Ethanol-100 Qualitest QL	804136 497665	200–5000 n/a	400
Isopropyl Alcohol (Isopropanol, 2-Propanol)	Ethanol-100 Qualitest QL	804136 497665	200–5000 n/a	400
Isopropylamine	Triethylamine-5	804134	5–30	5
Isopropyl mercaptan	Ethylmercaptan-0.5	804589	0.5–5.5	–
Kerosene	Qualitest QL	497665	n/a	–
Ketones	Qualitest QL	497665	n/a	–
Liquified Petroleum Gases	Gasoline-30 Qualitest QL	492870 497665	Semiquantitative n/a	–
Mercury	Hg-0.1 mg/m <sup>3</sup>	497663	0.1–0.8 mg/m <sup>3</sup> (0.01–0.08 ppm)	0.025 mg/m <sup>3</sup> (inorganic)
Methane	Natural Gas	655789	Semiquant. 5000+	–
Methanol (Methyl Alcohol)	Ethanol-100	804136	100–2350	200

Substance measured	Detector Tube applicable	Part No. (one package of 10 tubes)	Measuring range	Threshold Limit value 1998 ACGIH (ppm)
Methyl Alcohol (Methanol)	Ethanol-100	804136	100–2350	200
Methylamine	Triethylamine-5	804134	4–55	5
Methyl benzene (Toluene)	Tol.-5	803947	5–1000	50
Methyl bromide (Bromomethane)	Trichloroethane-5 MeBr-200 MeBr-2	487343 710544 710391	9–200 200–8000 ppm 2–100 ppm	5
2-Methyl butane	Hexane-20	497664	50–3000	–
Methyl chloroform (1,1,1-Trichloroethane)	Trichloroethane-5 Qualitest QL	487343 497665	5–1500 n/a	350
Methylcyclohexane	Hexane-20	497664	80–4900	400
Methylcyclopentane	Hexane-20	497664	150–3700	–
Methylene chloride (Dichloromethane)	CH <sub>2</sub> Cl <sub>2</sub> -50	804416	50–1000	50
Methylene dibromide (Dibromomethane)	Trichloroethane-5	487343	9–200	–
Methyl Ethyl Ketone (MEK)	MEK-50 Qualitest QL	813334 497665	50–4000 n/a	200
Methyl mercaptan	Ethylmercaptan-0.5	804589	0.5–5	0.5
2-Methyl pentane	Hexane-20	497664	150–4500	–
3-Methyl pentane	Hexane-20	497664	100–3700	–
Methylpropane (Isobutane)	Propane-200	804418	200–4200	–
Methylpropene (Isobutylene, Isobutene)	Ethylene-50	804428	400–2600	–
2-Methylpropyl Alcohol (Isobutanol, Isobutyl Alcohol)	Ethanol-100	804136	150–2900	50
Nitrogen Dioxide	NO <sub>2</sub> -0.5 NO <sub>2</sub> -2	487341 804435	0.5–50 2–140	3
Nitrous Fumes	Nitr.-0.5 Nitr.-2 Nitr.-10 Nitr.-50	487336 804425 803946 804426	0.5–50 2–140 10–300 50–3000	–
n-Nonane	Hexane-20	497664	50–2800	200
n-Octane	Hexane-20	497664	50–3000	300
Ozone	Ozone-0.05	804140	0.05–5	0.05 (ceiling)
Pentachloroethane	Trichloroethane-5	487343	10–300	–
n-Pentane	Hexane-20 Qualitest QL	497664 497665	50–3900 n/a	600
Perchloroethylene (Tetrachloroethylene)	Per-5 Per-10 Qualitest QL	804429 487337 497665	5–200 10–500 n/a	25
Phenol	Phenol-1 Qualitest QL	813778 497665	1–25 n/a	5
Phosgene	Phosgene-0.1	803949	0.1–20	0.1
Phosphine	PH <sub>3</sub> -0.05 PH <sub>3</sub> -0 1 PH <sub>3</sub> -50	497101 485680 489119	0.05–3 0.1–100 50–2000	0.3
Propane	Propane-200 Qualitest QL	804418 497665	200–4000 n/a	2500
n-Propanol (Propyl Alcohol)	Ethanol-100 Qualitest QL	804136 497665	100–3000 n/a	200
2-Propanol (Isopropanol, Isopropyl Alcohol)	Ethanol-100 Qualitest QL	804136 497665	200–5000 n/a	400
Propene (Propylene)	Ethylene-50 Qualitest QL	804428 497665	20–5000 n/a	–
Propyl Alcohol (n-Propanol)	Ethanol-100 Qualitest QL	804136 497665	100-3000 n/a	200
n-Propylamine	Triethylamine-5	804134	2–28	–
1-Propylchloride (1-Chloropropane)	Trichloroethane-5	487343	5–220	–

Substance measured	Detector Tube applicable	Part No. (one package of 10 tubes)	Measuring range	Threshold Limit value 1998 ACGIH (ppm)
2-Propylchloride (2-Chloropropane)	Trichloroethane-5	487343	8–1700	–
Propylene (Propene)	Ethylene-50 Qualitest QL	804428 497665	20–5000 n/a	–
Propylene dichloride (1,2-Dichloropropane)	Trichloroethane-5	487343	5–440	75
n-Propyl mercaptan	Ethylmercaptan-0.5	804589	0.7–8.0	–
Styrene	Styrene-10 Qualitest QL	804135 497665	10–300 n/a	20
Sulfur Dioxide	SO <sub>2</sub> -1 SO <sub>2</sub> -5 SO <sub>2</sub> -100	487338 497662 497661	0.5–25 5–120 100–4000	2
Sulfur Hexafluoride decomposition products	SF <sub>6</sub> Decomposition Products	804433	0.5–15	1000
1,1,2,2-Tetrabromoethane (Acetylene tetrabromide)	Trichloroethane-5	487343	5–200	1
1,1,2,2-Tetrachloroethane	Trichloroethane-5	487343	50–1000	1
Tetrachloroethylene (Perchloroethylene)	Per-5 Per-10 Qualitest QL	804429 487337 497665	5–200 10–500 n/a	25
Tetrahydrofuran	Ethanol-100	804136	Semi-quant	200
Toluene (Methyl benzene)	Tol.-5 Qualitest QL	803947 497665	5–1000 n/a	50
Tribromomethane (Bromoform)	Trichloroethane-5	487343	7–200	0.5
1,1,1-Trichloroethane (Methyl chloroform)	Trichloroethane-5 Qualitest QL	487343 497665	5–1500 n/a	350
1,1,2-Trichloroethane (Vinyltrichloride)	Trichloroethane-5	487343	10–170	10
Trichloroethene (Trichloroethylene)	Tri-5	487342	5–250	50
Trichloroethylene (Trichloroethene)	Tri-5	487342	5–250	50
Trichloromethane (Chloroform)	Trichloroethane-5	487343	8–100	10
1,2,3-Trichloropropane	Trichloroethane-5	487343	10–1200	10
Triethylamine	Triethylamine-5	804134	5–30	1
Trimethylamine	Triethylamine-5	804134	5–30	5
Trimethylene dichloride (1,3-Dichloropropane)	Trichloroethane-5	487343	5–220	–
2,2,4-Trimethylpentane	Hexane-20	497664	100–3000	–
Vinyl Chloride (Chloroethylene)	VC-1 Qualitest QL	803950 497665	1–70 n/a	5
Vinylidene chloride (1,1-Dichloroethylene)	Trichloroethane-5	487343	10–600	5
Vinyltrichloride (1,1,2-Trichloroethane)	Trichloroethane-5	487343	10–170	10
Water Vapor	H <sub>2</sub> O-10	655863	10–100% RH	–
o-Xylene (1,2-Xylene)	Tol.-5 Qualitest QL	803947 497665	5–2500 n/a	100
m-Xylene (1,3-Xylene)	Tol.-5 Qualitest QL	803947 497665	5–2500 n/a	100
p-Xylene (1,4-Xylene)	Tol.-5 Qualitest QL	803947 497665	5–1200 n/a	100

# Partial Detector Tube Cross Reference Chart For MSA, Draeger, and Sensidyne\*

Substance	Draeger Part No.	Range (ppm)	MSA Part No.	Range (ppm)	Sensidyne Part No.	Range (ppm)
Acetone	CH 22901	100 - 12000	804141	100 - 10,000	151L	50 - 12000
			804141	100 - 10,000	151	.01 - 2 Vol. %
Ammonia	8101711	.25 - 3	804405	2 - 500	3La	2.5 - 200
	6733231	2 - 30	804405	2 - 500		
			800300	20 - 1000	3M	10 - 1000
	8101941	5 - 100	804405	2 - 500	3La	2.5 - 200
	CH 31901	.5 - 10 Vol. %	804406	.1 - 10 Vol. %	3H	.2 - 32 Vol. %
			804406	.1 - 10 Vol. %	3HM	.05 - 3.52 Vol. %
	CH 20501	5 - 70	804405	2 - 500	3L	.5 - 60
			804405	2 - 500	180	1.5 - 30
Benzene	8101841 /	.5 - 10	807024 /	.5 - 25 / .5 - 10	121SP	.5 - 10
	6728561		655837			
	8101231	2 - 60	804411	5 - 100	121SL	1 - 100
	6728071	5 - 50	804411	5 - 100	121	2.5 - 120
	8101741	15 - 420	804132	5 - 500	121S	2 - 312
	6718801	5 - 40	804411	5 - 100		
	CH 24801	15 - 420	804132	5 - 500	171	.03 - 6 Vol. %
		655837	.25 - 10	121L	.125 - 60	
Carbon Dioxide (CO <sub>2</sub> )	8101811	.01 - .3 Vol. %	497606	100 - 3000	2LL	100 - 11500
	CH 23501	.1 - 6 Vol. %	487333	.1 - 7 Vol. %	2L	.13 - 6 Vol. %
	CH 31401	.5 - 10 Vol. %	487333	.1 - 7 Vol. %	2H	.5 - 20 Vol. %
	8101931	.5 - 10 Vol. %	487333	.1 - 7 Vol. %	2LL	10 - 11500
	CH 25101	1 - 20 Vol. %	804419	1 - 20 Vol. %	2HH	2.5 - 40 Vol. %
	CH 20301	5 - 60 Vol. %	804419	1 - 20 Vol. %	2HT	10 - 100 Vol. %
	6728351	100 - 3000	497606	100 - 3000		
Carbon Disulfide (CS <sub>2</sub> )	8101891	3 - 95	492514	2 - 300	13M	20 - 4000
	CH 23201	.1 - 10 mg/L	492514	2 - 300	13	.63 - 100
	6728351	5 - 60				
Carbon Monoxide (CO)	6733051	2 - 60	803943	5 - 1000	1LL	5 - 50
	CH 25601	5 - 700	803943	5 - 1000	1LM	8 - 1000
	CH19701	8 - 150	47134 / 803943	10 - 1000 / 5 - 1000	1La	25 - 1000
	CH 20601	10 - 3000	487334	10 - 3000	1LA, 1LM, 1L	See above / below
	CH 29901	.3 - 7 Vol. %	487335	.3 - 7 Vol. %		
	8101951	10 - 250	803943	5 - 1000	1L	5 - 2000
			487335	.3 - 7 Vol. %	1H	.1 - 10 Vol. %
			487335	.3 - 7 Vol. %	1HH	1 - 40 Vol. %
	6728571	.001 - .3 Vol. %	804423	.1 - 1% Vol.	1M	.05 - 4 Vol. %
MSA P/N 804421 is Vol. % equivalent of MSA P/N 487334. MSA P/N 815507 is the ppm equivalent of MSA P/N 487335.						
MSA P/N 804421 has a range of .001 - .3 Vol. % Carbon Monoxide. MSA P/N 815507 has a range of 3000 - 70,000 ppm Carbon Monoxide.						
Chlorine	6728411	.3 - 5	803944	.2 - 30	8La	.05 - 16
	CH 24301	.2 - 3	803944	.2 - 30	8LL	.025 - 2
	CH 20701	50 - 500	655862	50 - 500	8H	25 - 1000
			655862	50 - 500	8HH	.25 - 10 Vol. %
Chlorine Dioxide	CH 24301	.1 - 1.5	804133	.05 - 15	8La	.3 - 4.8
			804133	.05 - 15	8H	25 - 250
Ethyl alcohol	8101631	25 - 2000	804136	100 - 6000	112	.01 - 7.5 Vol. %
	CH 29701	100 - 3000	804136	100 - 6000	112L	25 - 2000
Formaldehyde	6733081	.2 - 5	497649	.1 - 55	91L	.1 - 32.5
	8101751	2 - 40	497649	.1 - 55	91	2 - 20
			497649	.1 - 55	91M	8 - 6400
Gasoline	5935156	10 - 60	492870	30 - 6000	101L	30 - 1000
			492870	30 - 6000	101	.015 - 1.2%

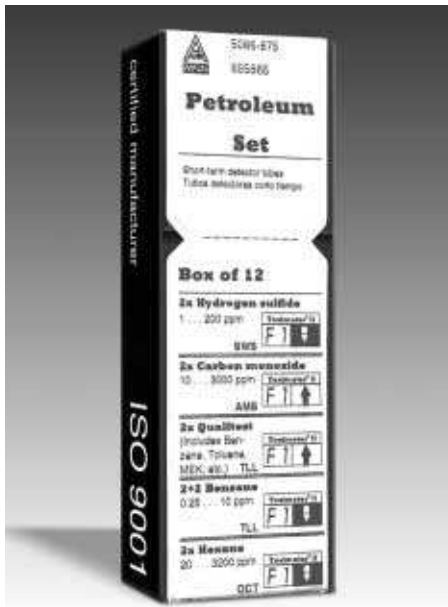
\* This cross reference chart is for basic reference only. MSA makes no guarantees for the accuracy of the cross reference chart.



Substance	Draeger Part No.	Range (ppm)	MSA Part No.	Range (ppm)	Sensidyne Part No.	Range (ppm)
<b>n-Hexane</b>	6728391	100 - 3000	497664	20 - 3200	102L	50 - 1200
			497664	20 - 3200	102H	.015 - 1.2 Vol. %
			497664	20 - 3200	105	80 - 2400
					106	300 - 4000
<b>Hydrogen Chloride (HCl)</b>	CH 29501	1 - 10	803948	1 - 30	14L	.2 - 40
	6728181	50 - 5000	803948	1 - 30	8HH	1.5 - 30 Vol. %
	8101681	1 - 10	803948	1 - 30	14M	10 - 1000
<b>Hydrogen Cyanide (HCN)</b>	CH 25701	2 - 30	803945	2 - 50	12L	.36 - 120
			803945	2 - 50	12LL	.2 - 7
			803945	2 - 50	12M	17 - 2400
			803945	2 - 50	12H	.05 - 2 Vol. %
<b>Hydrogen Fluoride (HF)</b>	CH 30301	1.5 - 15	804142	1 - 50	17	.25 - 100
<b>Hydrogen Sulfide (H<sub>2</sub>S)</b>	8101461	.2 - 5	487339	1 - 200	4LT	.1 - 4
	8101991	.2 - 6	487339	1 - 200	4LL	.25 - 60
	6728041	.5 - 15	487339	1 - 200	4L	1 - 240
	8101831	1 - 200	487339	1 - 200	4M	12.5 - 500
	6728821	2 - 200	487339	1 - 200		
	8101961	2 - 60	487339	1 - 200		
	CH 29801	5 - 60	487339	1 - 200		
	CH 29101	100 - 2000	487340	100 - 4000	4HM	25 - 1600
	CH 28101	.2 - 7 Vol. %	487340	100 - 4000	4H	10 - 3200
	8101211	2 - 40 Vol. %	655932	.1 - 4 Vol. %	4HH	.1 - 4 Vol. %
	CH 28201	.2 - 7 Vol. %	655932	.1 - 4 Vol. %	4HP	.25 - 20 Vol. %
			655932	.1 - 4 Vol. %	4HT	1 - 40 Vol. %
	6719001	1 - 200	487339	1 - 200		
	<b>MEK</b>	CH 22901	100 - 12000	813334	50 - 4000	152
813334		50 - 4000	151L	21 - 1680		
<b>Mercaptans (Methyl, Ethyl &amp; Butyl)</b>	6728981	.5 - 5 (Ethyl, Methyl, Butyl)	804589	.5 - 5 (Methyl)	71	.25 - 70 (Methyl)
	8101871	20 - 100 (Ethyl, Methyl, Butyl)	804589	.5 - 80 (Ethyl)	72	.5 - 120 (Ethyl)
			804589	.5 - 80 (Ethyl)	72L	.2 - 60 (Ethyl)
			804589	.5 - 5 (Methyl)	71H	20 - 2700 (Methyl)
			804589	1.5 - 15 (n-Butyl)	70L	.16 - 12.8 (n-Butyl)
			804589	.8 - 5 (t-Butyl)	75L	.5 - 30 mg/m <sup>3</sup> (tert-Butyl)
			804589	.8 - 5 (t-Butyl)	75	2.5 - 30 mg/m <sup>3</sup> (tert-Butyl)
			804589	.5 - 80 (Ethyl)	12L 72P	9 - 125 (Ethyl) 2.5 - 40 ppm (line pressure)
	<b>Mercury</b>	CH 23101	.05 - 2 mg/m <sup>3</sup>	497663	.1 - .8 mg/m <sup>3</sup> (.01 - .08 ppm)	40
<b>Methane / Natural gas</b>	CH 20001	Qualitative	655789	Semi-qual (5000 ppm)		-
<b>Methyl Bromide</b>	8101671	.5 - 30	710391	2 - 100	136La	1 - 36
	CH 27301	5 - 50	710391	2 - 100	136L	2 - 200
			487343	9 - 200	136H	10 - 600
			710544	200 - 8000		
<b>Methylene Chloride</b>	6724601	50 - 2000	804416	50 - 1000	138	25 - 1500
			804416	50 - 1000	51L	1 - 54
<b>Nitrogen Dioxide</b>	CH 30001	.5 - 25	487341	.5 - 50	9L	.5 - 125
	6719101	2 - 100	804435	2 - 140	10	2 - 200

Substance	Draeger Part No.	Range (ppm)	MSA Part No.	Range (ppm)	Sensidyne Part No.	Range (ppm)
<b>Nitrous Fumes</b>	CH 29401	.5 - 10	487336	.5 - 50	11L	.08 - 5
	CH 31001	2 - 100	804425	2 - 140	10	2 or 5 - 200
	6724001	20 - 500	803946	10 - 300	11S	5 - 575
	8101921	50 - 2000	804426	50 - 3000	11HA	50 - 2500
	CH 27701	100 - 5000	804426	50 - 3000		
<b>Ozone</b>	6733181	.05 - 7	804140	.05 - 5	18L	.025 - 3
	CH 21001	20 - 300	804140	.05 - 5	18M	4 - 400
<b>Perchloroethylene</b>	8101551	.1 - 4	804429	5 - 200	133LL	.1 - 9
	8101501	2 - 300	804429	5 - 200	133M	2 - 250
	CH 30701	10 - 500	487337	10 - 500		
	8101851	50 - 10000	487337	10 - 500	132Ha	20 - 1300
			487337	10 - 500	133Ha	7 - 900
		804429	5 - 200	133L	.5 - 37.5	
<b>Petroleum hydrocarbons</b>	8101691	10 - 300	497664	50 - 3000	105	100 - 3000
<b>(n-Octane)</b>	6730201	100 - 2500	497664	50 - 3000	101	.036 - .72 Vol. %
<b>Phenol</b>	8101641	1 - 20	813778	1 - 25	60	.4 - 187
<b>Phosgene</b>	8101521	.02 - 1	803949	.1 - 20	16	.05 - 20
		CH 28301	.25 - 15	803949	.1 - 20	
			CH 19401	.04 - 1.5		
<b>Phosphine</b>	8101611	.01 - 1	497101	.05 - 3	7La	.05 - 9.5
	CH 31101	.1 - 4	497101	.05 - 3	7L	.15 - 5
	8101621	25 - 10000	489119	50 - 2000		
	CH 21201	50 - 1000	489119	50 - 2000	7J	.00025 - .1 Vol. %
	8101801	1 - 100	485680	.1 - 100	7	2.5 - 100
<b>Propane</b>	CH 26101	.5 - 1.3 Vol. %	804418	200 - 4000	100B	.1 - 2 Vol. %
			804418	200 - 4000	103	.05 - 2.4 Vol. %
<b>Styrene</b>	6723301	10 - 200	804135	10 - 300	124L	2 - 100
	6733141	10 - 250	804135	10 - 300	124	10 - 1000
	CH 27601	50 - 400	804135	10 - 300	153	.015 - .9 Vol. %
<b>Sulfur Dioxide (SO<sub>2</sub>)</b>	6727101	.1 - 3	487338	.5 - 25	5Lb	.05 - 10
	6728491	.5 - 25	487338	.5 - 25	5La	.5 - 60
	CH 31701	1 - 25	487338	.5 - 25		
	CH 24201	20 - 200	497662	5 - 120	5L	1.25 - 200
	8101531	50 - 8000	497661	100 - 4000	5M	20 - 3600
			497661	100 - 4000	5H	.05 - 8 Vol. %
<b>Toluene</b>	8101661	5 - 300	803947	5 - 1000	122L	1 - 100
	8101701	50 - 400	803947	5 - 1000	122	5 - 600
	8101731	100 - 1800	803947	5 - 1000	161	.02 - .85 Vol. %
<b>Vinyl Chloride (VC)</b>	8101721	.5 - 30	803950	1 - 70	131L	.1 - 6.6
	6728031	1 - 50	803950	1 - 70	131La	.25 - 54
	CH 19601	100 - 3000	803950	1 - 70	131	.025 - 2 Vol. %
	6728061	.5 - 3				
<b>Water vapor</b>	8101781	1 - 40 mg/L	655863	10 - 100% RH	6	.5 - 32 mg/L
	5935136	30 - 60 lbs/mmcf	655863	10 - 100% RH	6LP	6 - 80 lb/mmcf
	5935135	50 - 1000 lbs/mmcf	655863	10 - 100% RH		
	8101321	.1 - 1 mg/L	655863	10 - 100% RH	6L	.1 - 2 mg/L
	8101081	1 - 18 mg/L	655863	10 - 100% RH		
	CH 23401	1 - 40 mg/L	655863	10 - 100% RH		
	6728531	5 - 350 mg/m <sup>3</sup>	655863	10 - 100% RH		
<b>Xylene</b>	6733161	10 - 1000	803947	5 - 2500 (o-Xylene)	123	5 - 500
			803947	5 - 2500 (m-Xylene)		

## INDUSTRY ACTION SETS



Industry Action Sets are variety packs of various detector tubes, designed specifically for different needs.

MSA offers Industry Action Sets for the following industries: Agricultural, Pharmaceutical, Petroleum, Mining, Pulp and Paper, Synthetics Manufacturing, and Semiconductor.

Conveniently packaged in boxes of 12, MSA's Industry Action Sets give you 20% more sampling than with traditional boxes.

### Set Contents

#### *Agricultural Set*

- 4 x Phosphine tubes
- 2 x Sulfur Dioxide tubes
- 4 x Methyl Bromide tubes
- 2 x Hydrogen Cyanide tubes

#### *Pharmaceutical Set*

- 3 x Acetic Acid tubes
- 3 x Aromatic HC tubes
- 3 x Qualitest tubes
- 3 x Hydrogen Cyanide tubes

#### *Petroleum Set*

- 2 x Hydrogen Sulfide tubes
- 2 x Carbon Monoxide tubes
- 2 x Qualitest tubes
- 4 x Benzene tubes
- 2 x Hexane tubes

#### *Mining Set*

- 3 x Carbon Monoxide tubes
- 2 x Nitrogen Dioxide tubes
- 3 x Nitrous fumes tubes
- 4 x Natural Gas/Methane tubes

#### *Pulp & Paper Set*

- 3 x Chlorine Dioxide tubes
- 2 x Sulfur Dioxide tubes
- 3 x Hydrogen Sulfide tubes
- 2 x Chlorine tubes
- 2 x Ozone tubes

#### *Synthetics Manufacturing Set*

- 2 x Toluene tubes
- 4 x Qualitest tubes
- 2 x Ethanol tubes
- 2 x Vinyl Chloride tubes
- 2x Trichloroethylene tubes

### Semiconductor Sets

There are four different sets targeted at specific semiconductor manufacturing processes:

#### *Chemical Vapor Deposition Process*

- 3 x Ammonia tubes
- 3 x CO<sub>2</sub> tubes
- 3 X Nitrous fumes tubes
- 3 x H<sub>2</sub>S tubes

#### *Etching Process*

- 4 x Ammonia tubes
- 4 x Chlorine tubes
- 4 x Hydrogen Chloride tubes

#### *Epitaxy Process*

- 3 x CO tubes
- 3 x Hydrogen Chloride tubes
- 3 X Phosphine tubes
- 3 x Phosgene tubes

#### *Crystal Growth Process*

- 6 x Phosgene tubes
- 6 x Phosphine tubes

Part No.	Description
655864	Agricultural Set, box of 12
655869	Pharmaceutical Set, box of 12
655865	Petroleum Set, box of 12
655867	Mining Set, box of 12
655868	Pulp and Paper Set, box of 12
655866	Synthetics Set, box of 12
655933	Chemical Vapor Deposition Process Set (Semiconductor), box of 12
655934	Etching Process Set (Semiconductor), box of 12
655935	Epitaxy Process Set (Semiconductor), box of 12
655931	Crystal Growth Process Set (Semiconductor), box of 12



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## ACCESSORIES

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### MSA/Auer Detector Tube Handbook

The MSA/Auer Detector Tube Handbook allows safety professionals to quickly and accurately select appropriate detector tubes for grab sample monitoring of more than 170 gases. The 181-page guide includes facts on chemical reaction and color change, interferences, cross-sensitivities, and more. The easy-to-use charts provide information on the substances measured by MSA/Auer Detector Tubes and the appropriate tubes for different applications.

Part No.	Description
813929	MSA/Auer Detector Tube Handbook



### MSA Kwik-Ref™ Detector Tube CD-ROM Database

The MSA Kwik-Ref Detector Tube CD-ROM Database offers complete technical data on MSA's full line of detector tubes with relevant color stain indicators. It contains complete information on pumps and spare parts, a complete 1998 TLV list, and other scientific data on over 1000 different substances (including flash points, boiling points, LELs, etc.). A personal "scratchpad" allows the user to add personal notes and information to database.

Part No.	Description
655930	MSA Kwik-Ref Detector Tube CD-ROM Database

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Note: This Data Sheet contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only they contain the complete and detailed information concerning proper use and care of these products.