Dräger

Dräger TubesÒ

Dräger CMSÒ

Dräger SensorsÒ

Gas Detection Selection Guide

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Detection Selection Guide

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How to Use this Guide

Substance
The first column lists gases and vapors in alphabetical order. The substances listed are generally in the proper chemical terminology. However, trade names, commonly used names, and other synonyms are also listed. If the targeted chemical is not found, please consult other reference materials since many chemical substances have various names and synonyms. Draeger is able to detect more gases than those listed in this guide. If unable to find a specific substance in this guide, contact Draeger for further assistance.

TLV-TWA 1999
For health and safety reference purposes, the next column lists the Threshold Limit Values (TLV ®) from the American Conference of Governmental Industrial Hygienists (ACGIH) publication, "1999 TLVs® and BEIs® Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices". TLVs refer to airborne concentration of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. Please bear in mind that the US Occupational Health and Safety Administration's (OSHA) Permissible Exposure Limits (PEL) or the State OSHA equivalents are those which must be adhered to for legal purposes. The ACGIH values may be different than those of OSHA or the State government.

Measurement Methods
The following three columns list the Dräger-Tubes®, Dräger-CMS® Chips, and / or the Dräger-Sensors® that are capable of quantitatively measuring the particular gas or vapor. The order of the listing does not signify any preference for a particular Tube, Chip, or Sensor method. The listing shows the methods that have been qualified for quantitative measurement of that compound.

Dräger-TubesÒ
The Dräger-Tube nomenclature used is chemical name (or family), number / letter. The chemical name or chemical families are the gas(es) or vapor(s) to which the Tube is calibrated. Measurement of other gases and vapors is possible. The number shows the lowest standard measuring limit for the targeted substance (this level may be different for other gases). Extension of this range may be possible. The measuring units are in ppm unless otherwise noted. The letter designates the generation of Tube. More than one generation may be offered simultaneously. The suffix "-D" indicates Diffusion Tubes while "-B" indicates Diffusion Badges. Dräger-Tubes and sampling pumps are not interchangeable with other manufacturer's pumps and tubes. Doing so could result in significant measuring errors.

Dräger-CMSÒ
The Dräger-CMS nomenclature used is chemical name (or family) and a number. The chemical name or chemical families are the gas(es) or vapor(s) to which the Tube is calibrated. Measurement of other gases and vapors is possible. The number shows the lowest standard measurable concentration. The measuring units are in ppm unless otherwise noted.

How to Use this Guide (Cont.)

Dräger-SensorsÒ
The electrochemical sensors are designated by the chemical name (CO, CL2, etc.) and by the generation of Dräger Sensors they belong to (XS) or (PS2). All electrochemical sensors measure in the ppm range unless otherwise noted. Combustible gas sensors (Ex) are designated with the two measuring methods; infrared (IR) or catalytic oxidation (Cat) and the applicable measuring units / ranges. The PID detects these compounds in ppm levels, generally at a concentration of less than 2000 ppm. Dräger-Sensors are designed exclusively for use in Dräger Portable instruments; the Pac III, Pac Ex, MiniWarn, and / or Multiwarn II Monitors. Draeger Safety makes no claims or implies that other sensors or other instruments are capable of measuring these compounds.

Environmental Ranges
Sampling conditions are generally assumed to be ambient measurement conditions; that is those between +32 to 105°F (0 to 40°C), 20.7 to 38.4 inches Hg (700 to 1300 mbar), and 5 to 95 %RH. Some of the listed measuring techniques may have wider or narrower environmental limits. Measurement of the listed gases and vapors outside the specified environmental range is possible, but special precautions, procedures, or conditioning equipment may be necessary. To be sure the Dräger detecting device will meet your requirements, consult your local Dräger representative for details.

Cross-Sensitivities
Measuring these gases and vapors in a complex matrix of various other substances may produce positive or negative reactions on these sensing devices. Measuring these gases and vapors in backgrounds not containing ambient concentrations of air (20.9 %Vol. Oxygen and 78 %Vol. Nitrogen) may or may not be possible. To determine whether the gas or vapor can be measured under your specific conditions, consult your local Dräger representative for details.

VOICEÒ
Dräger VOICE ® software contains most of the necessary special instructions and limitations for Tubes, CMS, and Sensors; as well as more information on these and other Dräger products. VOICE contains a larger listing of chemicals and their synonyms. This software program is commercially avaliable to users of Dräger equipment. Consult your local Dräger representative for details on acquiring this software.

Determining Unknown Substances
To use this guide, the targeted substance must be known. Page 12 of this guide lists several screening tools for help in determining an unknown substance. These devices are available individually or in a kit format for emergency response purposes. Consult your local Dräger representative for details.

Disclaimer
The recommendation of Dräger products for the detection of these chemical compounds corresponds to the latest data on use of the products available at the time of the printing. Our efforts were made to ensure that the all data is accurate, however no liability shall be assumed by Dräger for errors, which may have occurred. Consult your local Dräger representative to clarify or verify any data.

Substance	TLV-TWA 1999	Dräger-Tubes	Dräger-CMS	Dräger-Sensors
Acetaldehyde	C 25 ppm	Acetaldehyde 100/a		OV (XS) PID
Acetic Acid	10 ppm	Acetic Acid 5/a Acetic Acid 10/a-D	Acetic Acid 2.0	Ex (Cat) %LEL Ex (IR) %LEL
Acetic Anhydride	5 ppm	Formic Acid 1/a		
Acetone	500 ppm	Acetone 100/b	Acetone 40.0	Ex (Cat) %LEL PID
Acetylene		Hydrocarbons 0.1%/b Petroleum Hydrocarbons 10/a Petroleum Hydrocarbons 100/a		Ex (Cat) %LEL OV (XS) ppm
Acrolein	C 0.1 ppm	Dimethyl Sulfide 1/a		PID
Acrylonitrile	2 ppm	Acrylonitrile 0.5/a		OV-A (XS)
Alcohol		Alcohol 25/a Alcohol 100/a	See Specific Alcohol	OV (XS) Ex (Cat) %LEL
Allyl Chloride	1 ppm	Vinyl Chloride 0.5/b		PID
2-Aminoethanol	3 ppm	Ammonia 0.25/a		
2-Aminopropane	5 ppm	Cyclohexylamine 2/a		
Ammonia	25 ppm	Ammonia 0.25/a Ammonia 2/a Ammonia 5/a Ammonia 5/b Ammonia 0.5%/a Ammonia 20/a-D	Ammonia 0.20 Ammonia 2.0 Ammonia 10.0	NH3 (XS) 200 ppm NH3 (PS2) 300 ppm Ex (Cat) %LEL
n-Amyl Acetate	100 ppm	Ethyl Acetate 200/a		
Aniline	2 ppm	Aniline 0.5/a Aniline 5/a		
Antimony Hydride	0.1 ppm	Arsine 0.05/a		Hydride (XS)
Arsenic Trioxide	0.01 mg/m^3	Arsenic Trioxide 0.2/a		
Arsine	0.05 ppm	Arsine 0.05/a		Hydride (XS)
Aziridine	0.5 ppm	Ammonia 0.25/a		
Benzene	0.5 ppm	Benzene 0.5/a Benzene 0.5/c (Specific) Benzene 2/a Benzene 5/b Benzene 15/a Gasoline Detector	Benzene 0.20 (Specific) Benzene 0.50 (Specific) Benzene 10.0 (Specific)	Ex (Cat) %LEL PID
Benzyl Chloride	1 ppm	Perchloroethylene 0.1/a		
Bromine	0.1 ppm	Chlorine 0.2/a	Chlorine 0.20	CL2 (XS)
Bromoethane	5 ppm	Methyl Bromide 5/b		
BTX (BTEX)		Toluene 5/b		Ex (Cat) %LEL PID
Bromoform	0.5 ppm	Perchloroethylene 2/a		PID
1,3-Butadiene	2 ppm	Chloroprene 5/a Butadiene 10/a-D	Butadiene 1.0	OV (XS) Ex (Cat) % LEL PID
n-Butane	800 ppm	Hydrocarbons 0.1%/b	Propane 100	Ex (Cat) %LEL Ex (IR) %LEL

Substance	TLV-TWA 1999	Dräger-Tubes	Dräger-CMS	Dräger-Sensors
Iso-Butane		Hydrocarbons 0.1%/b		Ex (Cat) %LEL Ex (IR) %LEL
2-Butanone (MEK)	200 ppm	Acetone 100/b		Ex (Cat) %LEL
n-Butyl Acetate	150 ppm	Ethyl Acetate 200/a		Ex (Cat) %LEL
sec-Butyl Acetate	200 ppm	Acetaldehyde 100/a		Ex (Cat) %LEL
tert-Butyl Acetate	200 ppm	Acetaldehyde 100/a		Ex (Cat) %LEL
n-Butyl Alcohol	C 50 ppm	Alcohol 25/a Ethanol 1000/a-D		Ex (Cat) %LEL PID
n-Butylamine	C 5 ppm	Cyclohexylamine 2/a		Ex (Cat) %LEL
1-Butylene		Olefins 0.05/a		Ex (Cat) %LEL
tert-Butyl Mercaptan				Odorant (XS)
sec-Butyl Mercaptan				Odorant (XS)
n-Butyl Mercaptan	0.5 ppm			PID
Carbon Dioxide	5,000 ppm	Carbon Dioxide 100/a Carbon Dioxide 0.1%/a Carbon Dioxide 0.5%/a Carbon Dioxide 1%/a Carbon Dioxide 5%/A CO 200/a + CO2 2%/a Carbon Dioxide 500/a-D Carbon Dioxide 1%/a-D	Carbon Dioxide 200 Carbon Dioxide 1000 Carbon Dioxide 1.0%	CO2 (IR) 10,000 ppm CO2 (IR) 25.0 %Vol. CO2 (XS) 5.0 %Vol.
Carbon Disulfide	10 ppm	Carbon Disulfide 3/a Carbon Disulfide 30/a		PID
Carbon Monoxide	25 ppm	Carbon Monoxide 2/a Carbon Monoxide 5/c Carbon Monoxide 8/a (for CO in H2 only) Carbon Monoxide 10/b Carbon Monoxide 0.3%/b CO 200/a + CO2 2%/a *Carbon Monoxide 50/a-D*	Carbon Monoxide 5.0	CO (XS) 2000 ppm CO-HC (XS) 10,000 ppm Ex (Cat) %LEL
Carbon Tetrachloride	5 ppm	Carbon Tetrachloride 0.2/b Carbon Tetrachloride 1/a Carbon Tetrachloride 5/c		
Carbonyl Chloride	0.1 ppm	Phosgene 0.02/a Phosgene 0.25/b	Phosgene 0.05	COCl2 (PS2)
Chlorine	0.5 ppm	Chlorine 0.3/b Chlorine 0.2/a Chlorine 50/a	Chlorine 0.20	CL2 (XS)
Chlorine Dioxide	0.1 ppm	Chlorine 0.2/a		CL2 (XS)
Chlorobenzene	10 ppm	Chlorobenzene 5/a		PID
2-Chloro-1,3-Butadiene	10 ppm	Chloroprene 5/a		
1-Chloro-2,3-Epoxypropane	0.5 ppm	Epichlorohydrin 5/b		
Chloroform	10 ppm	Chloroform 2/a		
Chloroformates		Chloroformates 0.2/b		
Chloropicrin	0.1 ppm	Carbon Tetrachloride 1/a		
Chloroprene	10 ppm	Chloroprene 5/a		

Substance	TLV-TWA 1999	Dräger-Tubes	Dräger-CMS	Dräger-Sensors
Chromic Acid		Chromic Acid 0.1/a		
m-Cresol	5 ppm	Phenol 1/b		
o-Cresol and p-Cresol	5 ppm	Phenol 1/b		
Cumene	50 ppm	Toluene 50/a	Toluene 10.0	PID
Cyanide (aerosol)		Cyanide 2/a		
Cyanogen Chloride	C 0.3 ppm	Cyanogen Chloride 0.25/a		
Cyclohexane	300 ppm	Cyclohexane 100/a		PID, Ex (Cat) %LEL Ex (IR) %LEL
Cyclohexanone	25 ppm	Alcohol 25/a		PID
Cyclohexylamine	10 ppm	Cyclohexylamine 2/a		
DDVP	0.9 mg/m^3	Phosphoric Acid Esters 0.05/a		
Demeton	0.01 ppm	Thioether		
1,2-Diaminoethane	10 ppm	Ammonia 0.25/a		
Diborane	0.1 ppm			Hydrides (XS)
1,2-Dibromoethane		Methyl Bromide 5/b		
o-Dichlorobenzene	25 ppm	Chlorobenzene 5/a		PID
1,2-Dichloroethane	10 ppm	Methyl Bromide 5/b		
cis-1,2-Dichloroethylene	200 ppm			PID
trans-1,2-Dichloroethylene	200 ppm			PID
Dichloromethane	50 ppm	Methylene Chloride 100/a		
1,2-Dichloropropane	75 ppm	Methyl Bromide 5/b		
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1,000 ppm	Halogenated Hydrocarbons 100/a		
Dichlorovos	0.9 mg/m^3	Phosphoric Acid Esters 0.05/a		
Diesel Fuel		Petroleum Hydrocarbons 10/a		Ex (Cat) %LEL Ex (IR) %LEL, %Vol.
Diethylamine	5 ppm	Triethylamine 5/a		Amine (XS) Ex (Cat) %LEL
Diethylene Dioxide	20 ppm	Ethyl Glycol Acetate 50/a		
Diethyl Ether	400 ppm	Diethyl Ether 100/a		OV(XS) Ex (Cat) %LEL
Difluorochloromethane		Halogenated Hydrocarbons 100/a		
Dimethyl Acetamide	10 ppm	Dimethyl Formamide 10/b		
Dimethylamine	5 ppm	Triethylamine 5/a		Amine (XS)
Dimethyl Ether		Cyclohexane 100/a		Ex (Cat) %LEL Ex (IR) %LEL PID
Dimethylethylamine		Triethylamine 5/a		
Dimethyl Disulfide		Dimethyl Sulfide 1/a		Odorant (XS)
Dimethyl Formamide	10 ppm	Dimethyl Formamide 10/b		PID
1,1-Dimethyl Hydrazine	0.01 ppm	Hydrazine 0.25/a		
Dimethyl Sulfate	0.1 ppm	Dimethyl Sulfate 0.005/c		
Dimethyl Sulfide		Dimethyl Sulfide 1/a		Odorant (XS)

Substance	TLV-TWA 1999	Dräger -Tubes	Dräger -CMS	Dräger-Sensors
1,4-Dioxane	20 ppm	Ethyl Glycol Acetate 50/a		
Epichlorohydrin	0.5 ppm	Epichlorohydrin 5/b		PID
Ethane		Natural Gas Test		Ex (Cat) %LEL
Ethanethiol	0.5 ppm	Mercaptan 0.5/a Mercaptan 20/a	Mercaptan 0.25	Ex (IR) %LEL Odorant (XS)
Ethanol	1,000 ppm	Alcohol 25/a Alcohol 100/a Ethanol 1000/a-D	Ethanol 100	Ex (Cat) %LEL Ex (IR) %LEL OV (XS)
Ethanolamine	3 ppm	Ammonia 0.25/a		
Ether (Ethyl Ether)	400 ppm	Diethyl Ether 100/a		Ex (Cat) %LEL
Ethyl Acetate	400 ppm	Ethyl Acetate 200/a Ethyl Acetate 500/a-D		OV (XS) Ex (Cat) % LEL PID
Ethyl Acrylate	5 ppm	Methyl Acrylate 5/a		PID
Ethyl Alcohol	1,000 ppm	Alcohol 25/a Alcohol 100/a Ethanol 1000/a-D	Ethanol 100	Ex (Cat) %LEL Ex (IR) %LEL OV (XS)
Ethylamine	5 ppm	Triethylamine 5/a		
Ethyl Benzene	100 ppm	Ethyl Benzene 30/a		PID
Ethyl Bromide	5 ppm	Methyl Bromide 5/b		
Ethylene		Ethylene 0.1/a Ethylene 50/a		OV (XS) Ex (Cat) %LEL PID
Ethylene Bromide		Methyl Bromide 5/b		
Ethylene Chloride	10 ppm	Methyl Bromide 5/b Perchloroethylene 2/a		
Ethylene Diamine	10 ppm	Ammonia 0.25/a		
Ethylene Glycol	C 100 mg/m^3	Ethylene Glycol 10		
Ethylene Glycol Dinitrate	0.05 ppm	Nitroglycol 0.25/a		
Ethylene Glycol Monoethyl Ether Acetate	5 ppm	Ethyl Glycol Acetate 50/a		
Ethylene Glycol Monoethyl Ether	5 ppm	Ethyl Glycol Acetate 50/a		
Ethylene Oxide	1 ppm	Ethylene Oxide 1/a Ethylene Oxide 25/a		OV or OV-A (XS) Ex (Cat) %LEL
Ethyl Ether	400 ppm	Diethyl Ether 100/a		PID
Ethyl Glycol Acetate		Ethyl Glycol Acetate 50/a		
Ethyl Mercaptan	0.5 ppm	Mercaptan 0.5/a Mercaptan 20/a	Mercaptan 0.25	Odorant (XS) PID
Fluorine	1 ppm	Fluorine 0.1/a	Chlorine 0.20	CL2 (XS) 20.0 ppm
Fluorotrichloromethane	C 1,000 ppm	Halogenated Hydrocarbons 100/a		
Formaldehyde	C 0.3 ppm	Formaldehyde 0.2/a Formaldehyde 2/a BioCheck F	Formaldehyde 0.20	OV (XS)
Formic Acid	5 ppm	Formic Acid 1/a		

Substance	TLV-TWA 1999	Dräger-Tubes	Dräger-CMS	Dräger-Sensors
Freons		Halogenated Hydrocarbons 100/a		
Gasoline	300 ppm	Petroleum Hydrocarbons 10/a Petroleum Hydrocarbons 100/a	Petroleum Hydrocarbons 20.0 Petroleum Hydrocarbons 100	Ex (Cat) %LEL Ex (IR) %LEL
Germanium Hydride	0.2 ppm			Hydride (XS) Ex (IR) % LEL PID
Hexane	50 ppm	Hexane 100/a	Petroleum Hydrocarbons 20.0 Petroleum Hydrocarbons 100	Ex (Cat) %LEL Ex (IR) %LEL PID
Hexone (MIBK)	50 ppm	Acetone 100/b		Ex (Cat) %LEL
Hydrazine	0.01 ppm	Hydrazine 0.2/a Hydrazine 0.25/a		
Hydrocarbons		Petroleum Hydrocarbons 10/a Petroleum Hydrocarbons 100/a Hydrocarbons 0.1%/a Hydrocarbons 2	Petroleum Hydrocarbon 20.0 Petroleum Hydrocarbon 100	Ex (Cat) %LEL, ppm Ex (IR) %LEL, ppm, %Vol. PID
Hydrochloric Acid	C 5 ppm	Hydrochloric Acid 1/a Hydrochloric Acid 50/a Hydrochloric / Nitric Acid 1/a Hydrochloric Acid 10/a-D	Hydrogen Chloride 1.0 Hydrogen Chloride 20.0	HF / HCL (XS) 30.0 ppm
Hydrocyanic Acid	C 4.7 ppm	Hydrocyanic Acid 2/a Hydrocyanic Acid 20/a-D	Hydrogen Cyanide 2.0	HCN (XS)
Hydrogen		Hydrogen 0.2%/a		H2 (XS) Ex (Cat) %LEL
Hydrogen Chloride	C 5 ppm	Hydrochloric Acid 1/a Hydrochloric Acid 50/a Hydrochloric / Nitric Acid Hydrochloric Acid 10/a-D	Hydrogen Chloride 1.0 Hydrogen Chloride 20.0	HF / HCL (XS)
Hydrogen Cyanide	C 4.7 ppm	Hydrocyanic Acid 2/a Hydrocyanic Acid 20/a-D	Hydrogen Cyanide 2.0	HCN (XS)
Hydrogen Fluoride	C 3 ppm	Hydrogen Fluoride 0.5/a		HF / HCL (XS)
Hydrogen Peroxide	1 ppm	Hydrogen Peroxide 0.1/a	Hydrogen Peroxide 0.20	H2O2 (XS)
Hydrogen Sulfide	10 ppm	Hydrogen Sulfide 0.2/a Hydrogen Sulfide 0.2/b Hydrogen Sulfide 0.5/a Hydrogen Sulfide 1/d Hydrogen Sulfide 2/a Hydrogen Sulfide 2/b Hydrogen Sulfide 5/b Hydrogen Sulfide 100/a Hydrogen Sulfide 0.2%/A Hydrogen Sulfide 2%/a H2S + SO2 0.2%/A Hydrogen Sulfide 10/a-D	Hydrogen Sulfide 0.20 Hydrogen Sulfide 2.0 Hydrogen Sulfide 20.0 Hydrogen Sulfide 100	H2S (XS) 200 ppm H2S-HC (XS) 1000 ppm PID
Isoamyl Acetate	100 ppm	Ethyl Acetate 200/a		PID
Isobutyl Acetate	250 ppm			PID

Substance	TLV-TWA 1999	Dräger-Tubes	Dräger-CMS	Dräger-Sensors
Isobutyraldehyde				PID
Isopropene		Chloroprene 5/a		PID
Isopropyl Acetate	250 ppm	Ethyl Acetate 200/a		PID
Isopropyl Alcohol	400 ppm	Alcohol 25/a Alcohol 100/a Ethanol 1000/a-D	Iso-Propanol 40.0	OV (XS) Ex (Cat) %LEL PID
Isopropylamine	5 ppm	Cyclohexylamine 2/a		
Jet Fuel		Petroleum Hydrocarbons 10/a Petroleum Hydrocarbons 100/a		Ex (Cat) %LEL, ppm Ex (IR) %LEL, ppm
Kerosene		Petroleum Hydrocarbons 10/a Petroleum Hydrocarbons 100/a		Ex (Cat) %LEL, ppm Ex (IR) %LEL, ppm
Mercaptans	0.5 ppm	Mercaptan 0.5/a Mercaptan 20/a	Mercaptans 0.25	Odorant (XS)
Mercury Vapor	0.025 mg/m^3	Mercury 0.1/b		
Methane		Natural Gas Test		Ex (Cat) ppm, %LEL, %Vol. Ex (IR) ppm, %LEL, %Vol.
Methanethiol	0.5 ppm	Mercaptan 0.5/a Mercaptan 20/a	Mercaptan 0.25	
Methanol	200 ppm	Alcohol 25/a Alcohol 100/a Ethanol 1000/a-D	Methanol 20.0	OV (XS) Ex (Cat) % LEL Ex (IR) %LEL
2-Methoxyethyl Acetate	5 ppm	Ethyl Glycol Acetate 50/a		
Methyl Acetate	200 ppm	Ethyl Acetate 200/a		
Methyl Acrylate	2 ppm	Methyl Acrylate 5/a		
Methyl Alcohol	200 ppm	Alcohol 25/a Alcohol 100/a	Methanol 20.0	OV (XS) Ex (Cat) %LEL
Methylamine	5 ppm	Triethylamine 5/a	Ammonia 2.0	Amine (XS)
Methyl Bromide	1 ppm	Methyl Bromide 0.5/a Methyl Bromide 3/a Methyl Bromide 5/b		PID
Methyl Chloroform	350 ppm	Trichloroethane 50/d		
Methyl Ethyl Ketone	200 ppm	Acetone 100/b	Acetone 40.0	Ex (Cat) %LEL PID
Methyl Isobutyl Ketone	50 ppm	Acetone 100/b		Ex (Cat) %LEL PID
Methyl Mercaptan	0.5 ppm	Mercaptan 0.5/a Mercaptan 20/a	Mercaptan 0.25	Odorant (XS) PID
Methyl Methacrylate	100 ppm	Methyl Acrylate 5/a		OV-A (XS) PID
Methyl Propyl Ketone	200 ppm	Acetone 100/b		
Methyl Tertiary Butyl Ether	40 ppm	Acetaldehyde 100/a	MTBE 10.0	Ex (Cat) % LEL
Methylene Chloride		Methylene Chloride 100/a	Methylene Chloride 10.0	
Monostryrene (Styrene)	20 ppm	Monostyrene 10/a Monostyrene 10/b Monostyrene 50/a	Styrene 2.0	OV-A (XS) PID Ex (Cat) %LEL
Motor Fuel		Motor Fuel Detector		Ex (Cat) %LEL Ex (IR) ppm, %LEL, %Vol.

Substance	TLV-TWA 1999	Dräger-Tubes	Dräger-CMS	Dräger-Sensors
Natural Gas (Methane)		Natural Gas Test		Ex (Cat) ppm, %LEL, %Vol. Ex (IR) ppm, %LEL, %Vol.
Nickel	0.1 mg/m^3	Nickel 0.25/A		
Nickel Carbonyl	0.05 ppm	Nickel Tetracarbonyl 0.1/a		
Nickel Tetracarbonyl	0.05 ppm	Nickel Tetracarbonyl 0.1/a		
Nitric Acid		Nitric Acid 1/a Hydrochloric Acid / Nitric Acid 1/a		
Nitric Oxide	25 ppm	See Nitrous Fumes		NO (XS)
Nitrogen Dioxide	3 ppm	Nitrogen Dioxide 0.5/c Nitrogen Dioxide 2/c Nitrogen Dioxide 10/a-D	Nitrogen Dioxide 0.50	NO2 (XS)
Nitroglycol		Nitroglycol 0.25/a		
Nitrous Gases **(NO + NO2) or (NOx)**	3 ppm NO_2	Nitrous Gases 0.5/a Nitrous Gases 2/a Nitrous Gases 20/a Nitrous Gases 50/a Nitrous Gases 100/c	Nitrous Gases 0.50 Nitrous Gases 10.0	NO (XS) + NO2 (XS)
Nonane	200 ppm	Petroleum Hydrocarbons 10/a Petroleum Hydrocarbons 100/a	Petroleum Hydrocarbons 20.0	PID Ex (Cat) % LEL, ppm Ex (IR) % LEL, ppm
n-Octane	300 ppm	Petroleum Hydrocarbons 10/a Petroleum Hydrocarbons 100/a Motor Fuel Detector	Petroleum Hydrocarbons 20.0 Petroleum Hydrocarbons 100	Ex (Cat) %LEL, ppm Ex (IR) %LEL, ppm PID
Iso-Octane		Petroleum Hydrocarbons 10/a Petroleum Hydrocarbons 100/a		PID Ex (Cat) %LEL, ppm Ex (IR) %LEL, ppm
Oil Mist	5 mg/m^3	Oil Mist 1/a Oil 10/a-P		
Olefins (Butylene & Propylene)		Olefins 0.05%/a		OV (XS) Ex (Cat) %LEL
Oxirane	1 ppm	Ethylene Oxide 1/a Ethylene Oxide 25/a		
Oxygen		Oxygen 5%/B	Oxygen 1.0%	O2-LS (XS) %Vol.
Ozone	0.05 ppm	Ozone 0.05/b Ozone10/a	Ozone 25.0 (ppb)	
n-Nonane	200 ppm	Petroleum Hydrocarbons 10/a Petroleum Hydrocarbons 100/a	Petroleum Hydrocarbons 20.0	Ex (Cat) %LEL, ppm Ex (IR) %LEL, ppm PID
n-Pentane	600 ppm	Pentane 100/a		PID Ex (Cat) %LEL, %Vol., ppm Ex (IR) %LEL, % Vol., ppm
Perchloroethylene	25 ppm	Perchloroethylene 0.1/a Perchloroethylene 2/a Perchloroethylene 10/b Perchloroethylene 50/A Perchloroethylene200/a-D	Perchloroethylene 5.0	

Substance	TLV-TWA 1999	Dräger-Tubes	Dräger-CMS	Dräger-Sensors
Phenol	5 ppm	Phenol 1/b		
Phosgene	0.1 ppm	Phosgene 0.02/a	Phosgene 0.05	COCL2 (PS2)
Phosphine	0.3 ppm	Phosphine 0.01/a Phosphine 0.1/a Phosphine 25/A Phosphine 50/a Phosphine 0.01/a-B	Phosphine 0.10 Phosphine 1.0 Phosphine 20.0 Phosphine 200	Hydride (XS) 20.0 ppm PH3-500 ppm (XS)
Phosphoric Acid Esters		Phosphoric Acid Esters 0.05/a		
Propane	2,500 ppm	Hydrocarbons 0.1%/b	Propane 100	Ex (Cat) %LEL, %Vol, ppm Ex (IR) %LEL, % Vol, ppm
n-Propanol	200 ppm	Alcohol 100/a		PID ppm Ex (Cat) % LEL Ex (IR) % LEL
iso-Propanol	400 ppm	Alcohol 25/a Alcohol 100/a Ethanol 1000/a-D	iso-Propanol 40.0	OV (XS) Ex (Cat) % LEL Ex (IR) % LEL
Propionaldehyde		Ethyl Acetate 200/a Formaldehyde 0.2/a		PID
n-Propyl Acetate	200 ppm	Ethyl Acetate 200/a		PID
Propylene		Olefins 0.05%/a		OV (XS) Ex (Cat) % LEL PID
Propylene Dichloride	75 ppm	Methyl Bromide 5/b		
Propylene Imine	2 ppm	Ammonia 0.25/a		
Propylene Oxide	20 ppm	Ethylene Oxide 1/a Ethylene Oxide 25/a		OV (XS) Ex (Cat) %LEL PID
Pyridine	5 ppm	Pyridine 5/A		
Silane (Silicon Hydride)	5 ppm			Hydride (XS)
Stoddard Solvent	100 ppm	Petroleum Hydrocarbons 10/a		Ex (Cat) % LEL
Styrene	20 ppm	Monostyrene 10/a Monostyrene 10/b Monostyrene 50/a		OV-A (XS) PID Ex (Cat) % LEL
Sulfur Dioxide	2 ppm	Sulfur Dioxide 0.1/a Sulfur Dioxide 0.5/a Sulfur Dioxide 1/a Sulfur Dioxide 20/a Sulfur Dioxide 50/b Sulfur Dioxide 5/a-D	Sufur Dioxide 0.40 Sulur Dioxide 5.0	SO2 (XS)
Sulfuric Aicd	1 mg/m^3	Sulfuric Acid 1/a		
Systox (Demeton)	0.01 ppm	Thioether		
Tetrachloromethane	5 ppm	Carbon Tetrachloride 0.2/b Carbon Tetrachloride 1/a Carbon Tetrachloride 5/c		
Tetrahydrofuran	200 ppm	Alcohol 100/a		OV (XS) PID

Substance	TLV-TWA 1999	Dräger-Tubes	Dräger-CMS	Dräger-Sensors
Tetrahydrothiophene		Tetrahydrothiophene 1/b		Odorant (XS)
Thioether		Thioether		
Toluene	50 ppm	Toluene 5/b Toluene 50/a Toluene 100/a Toluene 100/a-D	Toluene 10.0	Ex (Cat) %LEL PID
Toluene Diisocyanate	0.005 ppm	Toluene Diisocyanate 0.02/A		
Toluene-2,4-Diisocyanate	0.005 ppm	Toluene Diisocyanate 0.02/A		
o-Toluidine	2 ppm	o-Toluidine 1/a		
1,1,1-Trichloroethane	350 ppm	Trichloroethane 50/d		
Trichloroethylene	50 ppm	Trichloroethylene 2/a Trichloroethylene 10/a Trichloroethylene 200/a-D	Trichloroethylene 5.0	PID
Trichlorofluoromethane	C 1,000 ppm	Halogenated Hydrocarbons 100/a		
Trichloromethane	10 ppm	Chloroform 2/a		
Triethylamine	1 ppm	Triethylamine 5/a	Ammonia 2.0	Amine (XS)
Trifluorobromomethane	1,000 ppm	Halogenated Hydrocarbons 100/a		
Trimethylamine	5 ppm	Triethylamine 5/a		Amine (XS) PID
Turpentine	100 ppm			Ex (IR) ppm, %LEL
Vinyl Acetate	10 ppm			OV (XS) PID
Vinyl Bromide	0.5 ppm			PID
Vinyl Chloride	1 ppm	Vinyl Chloride 0.5/b Vinyl Chloride 100/a	Vinyl Chloride 0.30 Vinyl Chloride 10.0	OV (XS) PID
Water Vapor		Water Vapor 0.1/a Water Vapor 0.1 Water Vapor 1/a Water Vapor 1/*b* Water Vapor 3/a Water Vapor 50/a Water Vapor 5/a-D	Water Vapor 0.40	
Xylene	100 ppm	Xylene 10/a Toluene 100/a-D	Xylene 10.0	Ex (Cat) %LEL PID
Zinc Chromate	0.01 mg/m^3	Chromic Acid 0.1/a		

Tools for Determining an Unknown Substance

General Screening Tubes

These Tubes provide a qualitative indication of a wide range of substances.

Measuring Device	Family	Substance(s) Measured
Polytest Tube	Organics	Ketones, Aromatics, Alcohols, Aliphatics, etc.
	Inorganics	Hydrogen Sulfide, Nitric Oxide, etc.
Acid Test Tube	Acids	Hydrochloric Acid, Nitric Acid, Chlorine, NO2, etc.
Amine Test Tube	Amines	Ammonia, Diethylamine, Triethylamine, etc.

Simultaneous Test Sets

Specially designed sets of five Tubes for determining an unknown substance or incident investigation. Ideal for Haz-Mat, Post-Fire Investigation, and Industrial Emergency Response.

Measuring Device	Family	Substance(s) Measured
Simultaneous Test Set I	Acid Gases	Hydrochloric Acid, Nitric Acid, etc.
	Hydrocyanic Acid	Hydrocyanic Aid
	Carbon Monoxide	Carbon Monoxide
	Basic Gases	Ammonia, Diethylamine, Triethylamine, etc.
	Nitrous Gases	Nitrogen Dioxide and Nitric Oxide
Simultaneous Test Set II	Sulfur Dioxide	Sulfur Dioxide
	Chlorine	Chlorine
	Hydrogen Sulfide	Hydrogen Sulfide
	Carbon Dioxide	Carbon Dioxide
	Phosgene	Phosgene
Simultaneous Test Set III	Ketones	Acetone, Methyl Ethyl Ketone (MEK), MIBK, etc.
	Aromatics	Benzene, Toluene, Xylene, Ethyl Benzene, etc.
	Alcohols	Ethanol, Methanol, Isopropanol, etc.
	Aliphatics	Octane, Hexane, Gasoline Vapors, etc.
	Chlorinated Hydrocarbons	Methylene Chloride, Carbon Tetrachloride, Percholorethylene, etc.

Civil Defense Sets (CDS)

Specially designed sets of five Tubes for determining an unknown substance or incident investigation.These sets are designed to measure potential chemical warfare gases.

Measuring Device	Family	Substance(s) Measured
Simultaneous CDS Set I	Blister Agents	S-Mustard, Lewisite, N-Mustard
	Blood Agents	Hydrogen Cyanide
	Choking Agents	Phosgene
Simultaneous CDS Set V	Blister Agents	S-Mustard
	Blood Agents	Cyanogen Chloride
	Choking Agents	Phosgene, Chlorine
	Nerve Agents	Tabin, Sarin, Soman

Draeger Sensors

Portable instruments provide continuous monitoring of a wide range of chemical substances. Detection limits vary with the method used.

Measuring Device	Family	Substance(s) Measured
Ex (Cat) Sensor	Organics	Detects a wide range of organic compounds that are readily oxidizable by the sensor's catalyst. Measurements are in the lower explosive limit range.
Photo Ionization Detector (PID)	Organics	Detects a wide range of organic compounds that are readily ionizable by the sensor's lamp. Measurements are generally in the low ppm levels (> 2000 ppm).

Dräger Detection Selection Guide

Dräger-Tubes Ò

People have been measuring gases and vapors with Dräger-Tubes since 1937. Over the past 60 years we have developed more Tubes and more detection systems than any other manufacturer. A Dräger-Tube is a glass vial filled with chemical reagents. The accuro hand pump (or accuro 2000 automated pump) is used to draw a calibrated 100 ml sample through the Tube. If the targeted gas or vapor is present, the reagents change color to indicate its presence and / or concentration. The chemical concentration is typically shown by a length of stain and measured by calibrated graduations on the Tube.

Also listed are Dräger Diffusion Tubes (-D), Badges (-B) and Bio-Check devices. These detection tools are for measuring gases and vapors over a period of time to determine the average exposure for that duration.
These items are ideal in determining compliance to allowable exposure limits or for use a screening tool to see whether further exposure monitoring is required.

The Dräger-Tubes system is the most popular form of gas and vapor detection in the world. Dräger-Tubes offer the versatility to cover a broad range of applications. Most tubes are designed to measure for the allowable health and safety limits, however they are also used for process control, measuring impurities in technical gases, or environmental compliance. Gases and vapor can be measured from ppb to ppm to %Volume levels. Accessories are available for measuring substances in compressed gas sources, in high temperatures, dissolved in water and in other situations.

This measurement system requires no calibration, no power supply, no maintenance, and no technical training to operate. There are over 200 different Dräger-Tubes for measuring or indicating over 500 different gases and vapors.

PUMP KITS AND TUBE HOLDERS	INCLUDES	PART NO.
Hard Side accuro Pump Kit	Pump, case and accessories	4056443
Deluxe accuro Pump Kit	Pump, case and accessories	4053474
Soft Side accuro Pump Kit	Pump, case and accessories	4053473
accuro Pump	Pump with Tube breaker	6400000
Diffusion Tube Holder	Package of 3	6733014
Phosphine Badge Holder		6400179
DRÄGER-TUBE®	**MEASURING RANGE**	**PART NO.**
Acetaldehyde 100/a	100 - 1,000 ppm	6726665
Acetic Acid 10/a-D	10 - 200 ppm x hr	8101071
Acetic Acid 5/a	5 - 80 ppm	6722101
Acetone 100/b	100 - 12,000 ppm	CH22901
Acid Test	Qualitative	8101121
Acrylonitrile 0.5/a	0.5 - 20 ppm	6728591
Alcohol 100/a	100 - 3,000 ppm	CH29701
Alcohol 25/a	25 - 5,000 ppm	8101631
Amine Test	Qualitative	8101061
Ammonia 0.25/a	0.25 - 3 ppm	8101711
Ammonia 0.5%/a	0.05 - 10 Vol.%	CH31901
Ammonia 2/a	2 - 30 ppm	6733231
Ammonia 20/a-D	20 - 1,500 ppm x hr	8101301
Ammonia 5/a	5 - 700 ppm	CH 20501
Ammonia 5/b	2.5 - 100 ppm	8101941
Aniline 0.5/a	0.5 - 10 ppm	6733171
Aniline 5/a	1 - 20 ppm	CH20401
Arsenic Trioxide 0.2/a	0.2 mg/m^3	6728951
Arsine 0.05/a	0.05 - 60 ppm	CH25001
Benzene 0.5/a	0.5 - 10 ppm	6728561
Benzene 0.5/c (Specific)	0.5 - 10 ppm	8101841
Benzene 15/a	15 - 420 ppm	8101741
Benzene 2/a	2 - 60 ppm	8101231
Benzene 5/b	5 - 50 ppm	6728071
Bio-Check F 0.05/a (5 tests, 5 clips)	0.05 - 1.2 ppm	6400330
Butadiene 10/a-D	10 - 300 ppm x hr	8101161
Carbon Dioxide 0.1%/a	0.1 - 6 Vol.%	CH23501
Carbon Dioxide 0.5%/a	0.5 - 10 Vol.%	CH31401
Carbon Dioxide 1%/a	1 - 20 Vol.%	CH25101
Carbon Dioxide 1%/a-D	1 - 30 Vol.% x hr	8101051
Carbon Dioxide 100/a	100 - 3,000 ppm	8101811
Carbon Dioxide 5%/A	5 - 60 Vol.%	CH20301
Carbon Dioxide 500/a-D	500 - 20,000 ppm x hr	8101381
Carbon Disulfide 3/a	3 - 95 ppm	8101891
Carbon Disulfide 30/a	32 - 3,200 ppm	CH23201
Carbon Monoxide 0.3%/b	0.3 - 7 Vol%	CH29901
Carbon Monoxide 10/b	10 - 3,000 ppm	CH20601
Carbon Monoxide 2/a	2 - 300 ppm	6733051
Carbon Monoxide 200/a + Carbon Dioxide 2%/a	200 - 2,500 ppm CO, 2 - 12 Vol.% CO_2	6718301
Carbon Monoxide 5/c	5 - 700 ppm	CH25601
Carbon Monoxide 50/a-D	50 - 600 ppm x hr	6733191
Carbon Monoxide 8/a	8 - 150 ppm	CH19701

DRÄGER-TUBE®	MEASURING RANGE	PART NO.
Carbon Tetrachloride 0.2/b	0.2 - 70 ppm	8101791
Carbon Tetrachloride 1/a	1 - 15 ppm	8101021
Carbon Tetrachloride 5/c	5 - 50 ppm	CH27401
Chlorine 0.2/a	0.2 - 30 ppm	CH24301
Chlorine 0.3/b	0.3 - 10 ppm	6728411
Chlorine 50/a	50 - 500 ppm	CH20701
Chlorobenzene 5/a	5 - 200 ppm	6728761
Chloroform 2/a	2 - 10 ppm	6728861
Chloroformates 0.2/b	0.2 - 10 ppm	6718601
Chloroprene 5/a	5 - 60 ppm	6718901
Chromic Acid 0.1/a	0.1 - 0.5 mg/m^3	6728681
Cyanide 2/a	2 - 15 mg/m^3	6728791
Cyanogen Chloride 0.25/a	0.25 - 5 ppm	CH19801
Cyclohexane 100/a	100 - 1,500 ppm	6725201
Cyclohexylamine 2/a	2 - 30 ppm	6728931
Diethyl Ether 100/a	100 - 4,000 ppm	6730501
Dimethyl Formamide 10/b	10 - 40 ppm	6718501
Dimethyl Sulfate0.005/c	0.005 - 0.05 ppm	6718701
Dimethyl Sulfide 1/a	1 - 15 ppm	6728451
Epichlorohydrin 5/b	5 - 50 ppm	6728111
Ethanol 1000/a-D	1,000 - 25,000 ppm x hr	8101151
Ethyl Acetate 200/a	200 - 3,000 ppm	CH20201
Ethyl Acetate 500/a-D	500 - 10,000 ppm x hr	8101241
Ethyl Benzene 30/a	30 - 600 ppm	6728381
Ethyl Glycol Acetate 50/a	50 - 700 ppm	6726801
Ethylene 0.1/a	0.2 - 5 ppm	8101331
Ethylene 50/a	50 - 2,500 ppm	6728051
Ethylene Glycol 10	10 - 180 mg/m^3	8101351
Ethylene Oxide 1/a	1 - 15 ppm	6728961
Ethylene Oxide 25/a	25 - 500 ppm	6728241
Fluorine 0.1/a	0.1 - 2 ppm	8101491
Formaldehyde 0.2/a	0.2 - 5 ppm	6733081
Formaldehyde 2/a	2 - 40 ppm	8101751
Formaldehyde Activation Tube-use with HCHO 0.2/a	To extend Measuring Range to 0.04 ppm	8101141
Formic Acid 1/a	1 - 15 ppm	6722701
Gasoline Detector	10 - 60 ppm	6400501
Halogenated Hydrocarbons 100/a	100 - 1,400 ppm	8101601
Hexane 100/a	50 - 3,000 ppm	6728391
Hydrazine 0.2/a	0.2 - 10 ppm	6733121
Hydrazine 0.25/a	0.1 - 10 ppm	CH31801
Hydrocarbon 2	3 - 23 mg/l	CH25401
Hydrocarbons 0.1%/b	0.1 - 0.8 Vol.% (Butane) 0.5 - 1.3Vol.% (Propane)	CH26101
Hydrochloric Acid 1/a	1 - 10 ppm	CH29501
Hydrochloric Acid 10/a-D	10 - 200 ppm x hr	6733111
Hydrochloric Acid 50/a	50 - 5,000 ppm	6728181
Hydrochloric Acid / Nitric Acid 1/a	1 - 10 ppm HCl 1 - 15 ppm HNO_3	8101681
Hydrocyanic Acid 2/a	2 - 150 ppm	CH25701
Hydrocyanic Acid 20/a-D	20 - 200 ppm x hr	6733221

DRÄGER-TUBE®	MEASURING RANGE	PART NO.
Hydrogen 0.2%/a	0.2 - 2 Vol.%	8101511
Hydrogen Fluoride 0.5/a	1.5 - 15 ppm	CH30301
Hydrogen Peroxide 0.1/a	0.1 - 3 ppm	8101041
Hydrogen Sulfide + Sulfur Dioxide 0.2%/A	0.02 - 7 Vol.%	CH28201
Hydrogen Sulfide 0.2%/A	0.2 - 7 Vol.%	CH28101
Hydrogen Sulfide 0.2/a	0.2 - 5 ppm	8101461
Hydrogen Sulfide 0.2/b	0.2 - 6 ppm	8101991
Hydrogen Sulfide 0.5/a	0.5 - 15 ppm	6728041
Hydrogen Sulfide 1/d	1 - 200 ppm	8101831
Hydrogen Sulfide 10/a-D	10 - 300 ppm x hr	6733091
Hydrogen Sulfide 100/a	100 - 2,000 ppm	CH29101
Hydrogen Sulfide 2%/a	2 - 40 Vol.%	8101211
Hydrogen Sulfide 2/a	2 - 200 ppm	6728821
Hydrogen Sulfide 2/b	1 - 60 ppm	8101961
Hydrogen Sulfide 5/b	5 - 600 ppm	CH29801
Mercaptan 0.5/a	0.5 - 5 ppm	6728981
Mercaptan 20/a	20 - 100 ppm	8101871
Mercury 0.1/b	0.05 - 2 mg/m^3	CH23101
Methyl Acrylate 5/a	5 - 300 ppm	6728161
Methyl Bromide 0.5/a	0.5 - 30 ppm	8101671
Methyl Bromide 5/b	5 - 50 ppm	CH27301
Methylene Chloride 100/a	100 - 2,000 ppm	6724601
Monostyrene 10/a	10 - 200 ppm	6723301
Monostyrene 10/b	10 - 250 ppm	6733141
Monostyrene 50/a	50 - 400 ppm	CH27601
Motor Fuel Detector	200 - 5,000 ppm	6400491
Natural Gas Test	0.5% Vol. (over / under)	CH20001
Nickel 0.25/A	0.25 - 1 mg/m^3	6728871
Nickel Tetracarbonyl 0.1/a	0.1 - 1 ppm	CH19501
Nitric Acid 1/a	1 - 50 ppm	6728311
Nitrogen Dioxide 0.5/c	0.5 - 25 ppm	CH30001
Nitrogen Dioxide 10/a-D	10 - 200 ppm x hr	8101111
Nitrogen Dioxide 2/c	2 - 100 ppm	6719101
Nitroglycol 0.25/a	0.25 ppm	6718201
Nitrous Gases 0.5/a	0.5 - 10 ppm	CH29401
Nitrous Gases 100/c	100 - 5,000 ppm	CH27701
Nitrous Gases 2/a	2 - 100 ppm	CH31001
Nitrous Gases 20/a	20 - 500 ppm	6724001
Nitrous Gases 50/a	50 - 2,000 ppm	8101921
Oil 10/a-P	25 - 100 micrograms	6728371
Oil Mist 1/a	1 - 10 mg/m^3	6733031
Olefins 0.05%/a	0.06 - 3.2 Vol.%	CH31201
Organic Arsenic Compounds & Arsine	3 mg org. arsenic/m^3	CH26303
Organic Basic Nitrogen Compounds	1 mg/m^3	CH25903
Oxygen 5%/B	5 - 23 Vol.%	6728081
Ozone 0.05/b	0.05 - 1.4 ppm	6733181
Ozone10/a	10 - 300 ppm	CH21001
Pentane 100/a	100 - 1,500 ppm	6724701
Perchloroethylene 0.1/a	0.1 - 4 ppm	8101551
Perchloroethylene 10/b	10 - 500 ppm	CH30701
Perchloroethylene 2/a	2 - 300 ppm	8101501

DRÄGER-TUBE®	MEASURING RANGE	PART NO.
Perchloroethylene 200/a-D	200 - 1,500 ppm x hr	8101401
Perchloroethylene 50/A	50 - 10,000 ppm	8101851
Perchloroethylene 50/A	50 - 10,000 ppm	8101851
Petroleum Hydrocarbons 10/a	10 - 300 ppm	8101691
Petroleum Hydrocarbons 100/a	100 - 2,500 ppm	6730201
Phenol 1/b	1 - 20 ppm	8101641
Phosgene 0.02/a	0.02 - 1 ppm	8101521
Phosgene 0.25/c	0.25 - 15 ppm	CH28301
Phosphine 0.01/a	0.01 - 1.0 ppm	8101611
Phosphine 0.01/a Badge (box of 10)	0.01 - 4.8 ppm	6400171
Phosphine 0.1/a	0.1 - 4 ppm	CH31101
Phosphine 25/A	25 - 10,000 ppm	8101621
Phosphine 50/a	15 - 1,000 ppm	CH21201
Phosphoric Acid Esters 0.05/a	0.05 ppm	6728461
Polytest	Qualitative	CH28401
Pyridine 5/A	5 ppm	6728651
Simultaneous Test Set I (inorganics)	5 compounds and 5 ranges	8101735
Simultaneous Test Set II (inorganics)	5 compounds and 5 ranges	8101736
Simultaneous Test Set III (organics)	5 compounds and 5 ranges	8101770
Simultaneous CDS (Civil Defense) Test Set I	5 compounds and 5 ranges	8103140
Simultaneous CDS (Civil Defense) Test Set V	5 compounds and 5 ranges	8103200
Sulfur Dioxide 0.1/a	0.1 - 3 ppm	6727101
Sulfur Dioxide 0.5/a	0.5 - 25 ppm	6728491
Sulfur Dioxide 1/a	1 - 25 ppm	CH31701
Sulfur Dioxide 20/a	20 - 2,000 ppm	CH24201
Sulfur Dioxide 5/a-D	5 - 150 ppm x h	8101091
Sulfur Dioxide 50/b	50 - 8,000 ppm	8101531
Sulfuric Acid 1/a	1 - 5 mg/m^3	6728781
Tetrahydrothiophene 1/b	1 - 10 ppm	8101341
Thioether	1 mg/m^3	CH25803
Toluene 100/a	100 - 1,800 pm	8101731
Toluene 100/a-D	100 - 3,000 ppm x h	8101421
Toluene 5/b	5 - 300 ppm	8101661
Toluene 50/a	50 - 400 ppm	8101701
Toluene Diisocyanate 0.02/A	0.02 - 0.2 ppm	6724501
Toluidine 1/a	1 - 30 ppm	6728991
Trichloroethane 50/d	50 - 600 ppm	CH21101
Trichloroethylene 10/a	50 - 2,000 ppm	CH24401
Trichloroethylene 2/a	2 - 250 ppm	6728541
Trichloroethylene 200/a-D	200 - 1,000 ppm x h	8101441
Triethylamine 5/a	5 - 60 ppm	6718401
Vinyl Chloride 0.5/b	0.5 - 30 ppm	8101721
Vinyl Chloride 100/a	100 - 3,000 ppm	CH19601
Water Vapor 0.1/a	0.05 - 1 mg/l	8101321
Water Vapor 0.1	1 - 40 mg/l	CH23401
Water Vapor 1/a	0.5 - 18 mg/l	8101081
Water Vapor 1/b	1 - 40 mg/l	8101781
Water Vapor 3/a	3 - 60 lbs/mmcf	8103031
Water Vapor 5/a-D	5 - 100 mg/liter x h	8101391
Water Vapor 50/a	50 - 1,000 lbs/mmcf	8103021
Xylene 10/a	10 - 400 ppm	6733161

Dräger Detection Selection Guide

Dräger-CMS Ò

The Dräger-CMS combines our 60 years of chemical reagent technology with advanced electronics to make one of the most accurate, versatile, and easy-to-use gas detection devices. The system consists of chemical specific Chips and the Analyzer. The Chip contains a chemical reagent that changes color when exposed to the targeted compound. The Analyzer measures the time over which this color change occurs, and determines the concentration based on the speed of the reaction.

To operate the system, slide the switch to position 1 and wait for the “load chip” prompt in the digital display. Then the, Chip is inserted into the Analyzer. The Analyzer’s LCD display prompts the user to move the slide switch from 1 to 2 to 3. After the reaction is analyzed, the concentration is shown on the display. This system couldn’t be easier because every Chip uses the exact same procedure; there is no room for error or misinterpretation.

Training is simple and the results are always specific and accurate. The CMS Analyzer measurement results are recorded for documentation at a later time. The Analyzer uses commonly acquired “AA” alkaline batteries and is ready to go at a moment’s notice. Uses include emergency response, documenting exposures to hazardous gases and vapors, selecting respiratory protection, or analysis of any gaseous sample quickly and accurately by all personnel.

The chemical specific Chips and the advanced electronics of the Analyzer also make this one of the most accurate gas and vapor measurement tools available. The pre-calibrated Chips mean no gas calibration type maintenance is required. The Analyzer eliminates all interpretation or usage error that may be associated with other methods. The mass flow pump system ensures that the exact amount of sample is taken and the opto-electronics make precise measurements of the chemical reaction. Several third-party laboratories have proved confirmation of the CMS accuracy and specificity.

Dräger CMS Chip	Measuring Range	Part No.
Acetic Acid	2.0 - 50.0 ppm	6406330
Acetone	40.0 - 600 ppm	6406470
Ammonia	0.2 – 5.0 ppm	6406550
Ammonia	2.0 - 50.0 ppm	6406130
Ammonia	10.0 - 150 ppm	6406020
Benzene	0.20 - 10.0 ppm	6406030
Benzene	0.50 - 10.0 ppm	6406160
Benzene	10.0 - 250.0 ppm	6406280
Butadiene	1.0 - 25.0 ppm	6406460
Carbon Dioxide	200- 3,000 ppm	6406190
Carbon Dioxide	1,000 - 25,000 ppm	6406070
Carbon Dioxide	1.0 - 20.0 vol%	6406210
Carbon Monoxide	5.0 - 150 ppm	6406080
Chlorine	0.20 - 10.0 ppm	6406010
Ethanol	100.0 - 2,500 ppm	6406370
Formaldehyde	0.20 - 5.0 ppm	6406540
Hydrochloric Acid	1.0 - 25.0 ppm	6406090
Hydrochloric Acid	20.0 - 500 ppm	6406140
Hydrocyanic Acid	2.0 - 50.0 ppm	6406100
Hydrogen Peroxide	0.20 - 2.0 ppm	6406440
Hydrogen Sulfide	0.2 - 5.0 ppm	6406520
Hydrogen Sulfide	2.0 - 50.0 ppm	6406050
Hydrogen Sulfide	20.0 - 500 ppm	6406150
Hydrogen Sulfide	100 - 2,500 ppm	6406220
Iso-Propanol	40.0 - 1,000 ppm	6406390
Mercaptan	0.25 - 6.0 ppm	6406360
Methanol	20.0 - 500 ppm	6406380
Methylene Chloride	10.0 - 200 ppm	6406530
Methyl Tertiary Butyl Ether (MTBE)	20.0 – 200 ppm	6406510
Nitrogen Dioxide	0.50 - 25.0 ppm	6406120
Nitrous Gases (NO + NO2)	0.50 - 15.0 ppm	6406060
Nitrous Gases (NO + NO2)	10.0 - 200 ppm	6406240
Oxygen	1.0 - 25.0 vol%	6406490
Ozone	25.0 - 1,000 ppb	6406430
Perchloroethylene	5.0 - 150 ppm	6406040
Petroleum Hydrocarbons	20.0 - 500 ppm	6406200
Petroleum Hydrocarbons	100 - 3,000 ppm	6406270
Phosgene	0.05 - 2.0 ppm	6406340
Phosphine	0.1 - 2.50 ppm	6406400
Phosphine	1.0 - 25.0 ppm	6406410
Phosphine	20.0 - 500 ppm	6406420
Phosphine	200 - 5,000 ppm	6406500

Dräger CMS Chip	Measuring Range	Part No.
Propane	100 - 2,000 ppm	6406310
Sulfur Dioxide	0.40 - 10.0 ppm	6406110
Sulfur Dioxide	5.0 - 150 ppm	6406180
Toluene	10.0 - 300 ppm	6406250
Training Chip	0.2 -10 ppm	6406290
Trichloroethylene	5.0 - 100 ppm	6406320
Vinyl Chloride	0.30 - 10.0 ppm	6406170
Vinyl Chloride	10.0 - 250 ppm	6406230
Water Vapor	0.40 - 10.0 mg/L	6406450
Xylene	10.0 - 300 ppm	6406260
Dräger CMS Analyzer	**Includes**	**Part No.**
Analyzer w/ Datarecorder	Analyzer Batteries, Tool & Manual	6405300

Dräger Detection Selection Guide

Dräger-Sensors Ò

Dräger is one of the few gas detection instrument manufacturers to actually make their own sensors. We utilize electrochemical, catalytic oxidation (Cat), thermal conductivity, infrared (IR), and photo-ionization (PID) measurement techniques. Dräger-Sensors and portable instruments provide “hands-free” measurement and alarm of hazardous levels of gases or vapors.

Dräger manufactures more than 20 different electrochemical sensors between the PS2 and XS series of sensors. Our intelligent and interchangeable sensor design means that any sensor can be plugged into any Dräger instrument and are ready for operation. An EPROM on the sensor retains sensor identification, calibration data, alarm set points, and many other parameters. When installed, the sensor downloads the stored data for use by the Dräger instrument. Other unique features include an internal temperature compensation circuit, pressure compensating structures, the three-electrode design, and internal filters that scrub our interfering compounds.

Our catalytic oxidation sensors (Ex-Cat) measure a wide range of combustible gases and vapors. The Dräger-Sensor Ex-Cat is capable of measuring many heavier compounds like octane and nonane which are not possible with other catalytic sensors. A unique feature of the Dräger-Sensor Ex-Cat is the ability to measure methane (CH4) in %LEL as well as %Volume ranges. Measure methane up to 100 %Vol. is possible through the built-in thermal conductivity sensor.

Two different infrared sensors (IR) are available from Dräger. The carbon dioxide (CO2-IR) sensor can measure low ppm levels for indoor air quality, but also accurately measure up to 25 %Vol. CO2. The combustible gas version (Ex-IR) measures a wide range of combustible gases and vapors. The advantage of this technique is the ability to measure many gases in the ppm levels, in the absence of oxygen (O2), and when gases that adversely effect the catalytic sensor (Ex-Cat) are present.

The Pac III can use any of electrochemical sensors for toxic gases or oxygen. A large display indicates concentration and attention-demanding audible and visual alarms tell the user to take the appropriate actions. Datalogging versions that record and document exposures for compliance to health and safety standards are available.

The MiniWarn and Multiwarn II combine various sensor methods to detect and warn for combustible gases, oxygen and toxic gases in one unit. These units are ideal for confined space entry commonly found in the utility, manufacturing or chemical industries. They are also useful in other applications where more than one gas hazard is present. The Multiwarn II may be equipped with the infrared combustible gas or carbon dioxide sensor

The Multi-PID and Pac Ex measure a wide range of organic compounds. The Multi-PID detects these compounds in the lower ppm levels using a Photo Ionization Detector (PID). The Pac Ex measures combustible gases in the %LEL or methane in the %Vol. range using the catalytic (CAT) sensor

Dräger-Sensors®	Gas(es) Measured	Max Range	Resolution	Part No.
Amine (XS)	Dimethylamine, Trimethylamine, etc.	0-100 ppm	1 ppm	6809545
CL2 (XS)	Chlorine, Fluorine, Bromine, CLO2	0-20.0 ppm	0.01 ppm	6809165
CO (XS-R)	Carbon Monoxide	0-2000 ppm	1 ppm	6810258
CO 9XS)	Carbon Monoxide	0 - 2000 ppm	1 ppm	6809105
CO (PS2)	Carbon Monoxide	0-2000 ppm	1 ppm	6809005
CO-HC (XS)	Carbon Monoxide-High Concentration	0-10,000 ppm	1 ppm	6809120
CO2 (IR)	Carbon Dioxide	0-25.0 %Vol. 0-5.00 %Vol. 0-10,000 ppm	0.1 %Vol. 0.01 %Vol. 100 ppm	Multiwarn II
CO2 (XS)	Carbon Dioxide	0-5.00 %Vol.	0.1% Vol.	6809175
COCL2 (PS2)	Phosgene	0-3.00 ppm	0.01 ppm	6808582
Ex (Cat)	Combustible Gases Combustible Gases Methane	0-100 %LEL 0-10,000 ppm 0-100 %Vol.	1 %LEL 100 ppm 0.1 % Vol.	6808280
Ex (Cat FR)	Combustible Gases Combustible Gases Methane	0-100 %LEL 0-10,000 ppm 0-100 %Vol.	1 %LEL 100 ppm 0.1 % Vol.	
Ex (IR)	Combustible Gases Combustible Gases Combustible Gases	0-100 %LEL 0-10,000 ppm 0-100 %Vol.	1 %LEL 100 ppm 0.1 % Vol.	Multiwarn II
H2 (XS-R)	Hydrogen	0-2000 ppm	1 ppm	6809185
H2O2 (XS)	Hydrogen Peroxide	0-20.0 ppm	0.1 ppm	6809170
H2S (XS)	Hydrogen Sulfide	0-100 ppm	1 ppm	6809110
H2S (XS-R)	Hydrogen Sulfide	0-100 ppm	1 ppm	6810260
H2S (PS2)	Hydrogen Sulfide	0-100 ppm	1 ppm	6809010
H2S-HC (XS)	Hydrogen Sulfide - High Concentration	0-1000 ppm	1 ppm	6809180
HCN (XS)	Hydrogen Cyanide	0-50.0 ppm	0.1 ppm	6809150
HF / HCL (XS)	Hydrogen Fluoride / Hydrogen Chloride	0-30.0 ppm		6809140
Hydride (XS)	Phosphine (PH3), Arsine (AsH3), etc.	0-10.0 ppm	0.01 ppm	6809135
NH3 (PS2)	Ammonia	0-300 ppm	1 ppm	6809045
NH3 (XS)	Ammonia	0-200 ppm	1 ppm	6809145
NO (XS)	Nitric Oxide	0-100 ppm	1 ppm	6809125
NO2 (XS)	Nitrogen Dioxide	0-50.0 ppm	0.1 ppm	6809155
O2 (XS)	Oxygen	0-25%Vol.	0.1% Vol.	6809130
O2 (XS)	Oxygen	0-25.0 %Vol.	0.1 %Vol.	6810262
O2 (PS2)	Oxygen	0-25.0 %Vol.	0.1 %Vol.	6809030
Odorant (XS)	Mercaptans, Dimethyl Sulfide, etc.	0-40.0 ppm	1 ppm	6809200
OV (XS)	Organic Vapors	0-200 ppm	1 ppm	6809115
OV-A (XS)	Organic Vapors	0-100 ppm	0.1 ppm	6809522
PH3 (HC)	Phophine	0-1000 ppm	1 ppm	6809535
PID	Photo Ionization Detector	0-2000 ppm	1 ppm	Multi-PID
SO2 (XS)	Sulfur Dioxide	0-50.0 ppm	0.1 ppm	6809160


Dräger
Pac III


Pac Ex
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Dräger
MiniWarn


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