



## Detector Tubes, Sorbent Tubes and Pumps

[ Protection for Man and the Environment ]

**MSA**

# Toximeter® II

[ Electronically controlled detector tube pump ]



## [ General Remarks ]

The Toximeter II is suitable for differing measuring tasks:

- measurements with detector tubes
- collection of samples with sorbent tubes [collection time or volume can be preset]
- collection of samples using sample bags/gas-washing bottles [impinger]
- as a pump to generate smoke with smoke tubes or cartridges

## [ Benefits ]

- Multifunctional use in varied measurement tasks and technologies
- High accuracy of measurement
- Simple, menu assisted operation, easy to handle
- Certified for use in potentially explosive atmospheres
- Multiple functions reduce the cost of measuring hazardous substances
- Battery pack exchangeable in hazardous areas

## [ Function ]

### Detector tube pump

The Toximeter II is a continuously operating, electronically controlled detector tube pump.

The "stroke volume" [electronic stroke  $100 \pm 5$  ml] is regulated by a temperature-compensated differential pressure sensor. Detector tubes are inserted on the inlet side [tube port with white arrow] as well as the outlet side [blue arrow].

For increased accuracy the calibration factor "F" must be considered. This calibration factor and the number of pump strokes are set with the appropriate menus prior to the start of the measurement. The presently available range of detector tubes and tubes in stock on site can be used without restrictions.

### Sampling pump

Sorbent tubes and gas-washing bottles are used only on the inlet side [constant flow approx. 0.25 LPM] – collection time or sampling volume can be preset.

### Additional functions

Use of smoke generating tubes and collecting samples with a gas bag only on the outlet side. Menus are available for the tightness check and the selection of the language.

## [ Construction ]

The Toximeter II consists of a changeable battery pack and a pump assembly with:

- membrane pump
- differential pressure sensor
- two tube ports
- display to indicate the main and sub-menus
- two pushbutton switches [yellow/black] to select the menus
- fixture to break off tips
- two LED's and an acoustic signal transmitter

## [ Technical Data ]

**Dimensions:** 194 x 72 x 33 mm [H x W x D]

**Weight:** 580 g

**Battery type:**  
NiMH

**Service time per battery charge:**  
approx. 8 h

**Temperature:**  
– 10 to + 50 °C

**Protection class:**  
IP 54

**ATEX Approval:**  
II 1G EEx ia IIC T4

**Signal transmitter:**  
visual by 2 LED's, acoustic by piezo buzzer

**Automatic switch off:**  
after 10 minutes

## [ Ordering Information ]

D5142705 Toximeter II [without charger]

D6172760 DELTA charger

10074665 Intrinsically safe battery pack, rechargeable, with charge jack

D6172153 Leather carrying case

D5142707 Adaptor for sampling hose

# Gas-Tester II H and Kwik-Draw

[ Mechanically controlled detector tube pumps ]

## [ Application ]

The Gas-Tester II H with incorporated stroke counter is a manually – and intermittently – operated detector tube pump which, together with detector tubes, is used to monitor the ambient air or the air in confined spaces for hazardous gases. Measurements using the Gas-Tester II H and appropriate detector tubes are required in areas where combustible, toxic or corrosive components as well as substances dangerous to human health can occur. One of many applications is e.g. monitoring the workplace atmosphere for TLV compliance.

## [ Design and Function ]

The Gas-Tester II H is a bellows-type pump. It is set for action by compressing the bellows. The actual pump stroke can then be started at any time by pressing the release button. After the defined sample [100 ml] has been drawn through the tube, the end-of-stroke indicator signals this by an obvious colour change. A high accuracy of measurement is guaranteed because the sample draw procedure itself is controlled only by the specifications of the pump and the flow resistance of the detector tube.

In addition, the Gas-Tester II H can increase the accuracy of measurements with other short-term detector tubes.

## [ Features and Benefits ]

- Accurate measurements
- Elimination of errors by:
  - Defined sample draw volume [guaranteed by locking mechanism and end-of-stroke indicator]
  - Unconstrained relaxation of the bellows
  - Existence of an end-of-stroke indicator [prevents premature sample cut-off]
  - Additional incorporated stroke counter
- Antistatic, shock-resistant housing
- Small number of component parts
- Requires little maintenance

## [ Technical Data ]

<b>Sampling volume:</b>	[100 ± 3] ml/stroke
<b>Sampling time:</b>	Depends on flow resistance of the detector tube, typical value 20 sec.
<b>Weight:</b>	350 g
<b>Dimensions:</b>	Length 210 mm, largest diameter 75 mm
<b>ATEX Approval:</b>	II 1G C IIC T6

## [ Ordering Information ]

D5146760	Gas-Tester II H
<b>A</b>	
D5146770	Carrying case for Gas-Tester II H and one package detector tubes resp. spare parts kit
<b>B</b>	
D5146709	Leather carrying case for Gas-Tester II H and 4 packages detector tubes and sampling line [4 m] resp. space for 8 packages detector tubes in the outer case
<b>C</b>	
D5146914	Large carrying case with space for 24 packages of detector tubes, pump, a 4 m sampling line and the spare parts kit [delivery without the pictured devices]
<b>D</b>	
D5146906	Spare parts kit [includes spare parts and sealing caps]
<b>E</b>	
D5140924	Sealing caps for detector tubes [10 pcs.]
<b>E</b>	
D5146705	Sampling line [4 m] with tube holder
<b>F</b>	
D5140927	Sampling line [4 m] without tube holder
<b>F</b>	
10015366	Sampling line [15 m] with tube holder
<b>F</b>	
D5146761	Kwik-Draw Basic detector tube pump [without end of stroke indicator]
<b>G</b>	
D5146762	Kwik-Draw Deluxe detector tube pump [incorporated end of stroke indicator]
<b>G</b>	



# Gas-Tester

[ Mechanically forced detector tube pump ]

## [ Application ]

The Gas-Tester is a manually operated detector tube pump which, together with detector tubes, is used to quickly and accurately measure and monitor gases and vapours in the range of the threshold limit value [TLV]. The application of the Gas-Tester is everywhere that where gaseous contaminants in air can be expected, especially where work with technical gases is performed.

## [ Design and Function ]

The main components of the Gas-Tester are an aspirator bulb and a pump body into which the detector tube is inserted. When the aspirator bulb expands, the resultant negative pressure draws sampling air through the detector tubes.

The design of the Gas-Tester is as simple as possible. It consists of only 10 components and is disassembled and reassembled in a short time. The use of plastic and rubber makes the device largely resistant against corrosive gases and vapours.

Except for a simple leak test, the robust design requires practically no maintenance.

## [ Features ]

- One hand operation
- Always ready for use
- Simple handling
- Consists of only 10 components
- Robust design
- Requires practically no maintenance
- Economical

## [ Technical Data ]

<b>Sampling volume:</b>	Approx. 100 ml/stroke
<b>Sampling time:</b>	Approx. 10 – 30 seconds, depending on type of tube
<b>Weight:</b>	120 g/Dimensions: Length 148 mm, largest diameter 68 mm

## [ Ordering Information ]

D5140904	Gas-Tester
<b>A</b>	
D5140911	Carrying case for Gas-Tester and one package detector tubes
<b>B</b>	
D5140912	Leather carrying case for Gas-Tester and 3 packages detector tubes
<b>C</b>	
D5140920	Selection of spares and accessories [1 special key to remove the valve ring, 3 valve rings, 10 sealing caps to close opened tubes]
<b>D</b>	
D5140705	Sampling line [4 m] with tube holder
<b>E</b>	
D5140927	Sampling line [4 m] without tube holder
<b>D</b>	
10015366	Sampling line [15 m] with tube holder
<b>E</b>	
D5140924	Sealing caps to close opened tubes [package of 10]
<b>E</b>	
D5140929	Exhaust cooling probe
<b>F</b>	



Further information on request

# Short Term Detector Tubes

[ for Gas-Tester, Gas-Tester II H and Toximeter® II ]

The combination of MSA detector tubes and pumps offers a quick yet precise measuring system to detect hazardous gases and vapours. The filling material in detector tubes is calibrated and adjusted to the required test gas and will

change colour if this gas is present. The length of this discoloration indicates the concentration of the hazardous gas or vapour and can be measured by a printed scale on most of the tubes.

Substance measured	Detector tube applicable	Part No. [10 tubes/pkg]	Measuring range [ppm]
<b>A</b> Acetaldehyde	Formaldehyde-0.1	D5086813	5 ... 50
Acetic Acid	Acetic Acid-1	D5086821	1... 80
Acetylene	CO-0.1%	D5085822	400... 8300
Acetone	Acetone-100	D5086829	100... 10000
	MEK-50	D5086837	25 ... 3500
Acrolein	Acrolein-0.1	10017882	0.1 ... 10
Acrylonitrile	Acrylonitrile-0.5 <sup>3]</sup>	10016376	0.5 ... 30
Alcohols, aliph.	Ethanol-100	D5086818	100... 6000 [Ethanol]
Amines	Triethyl Amine-5	D5086816	5 ... 30
Aminopropane <i>see Propyl Amine</i>			
Ammonia	NH <sub>3</sub> -2	D5085845	2 ... 600
	NH <sub>3</sub> -20	D5085814	20...1000
	NH <sub>3</sub> -100	D5086859	100... 2000
	NH <sub>3</sub> -0.1%	D5085815	0.1 ... 10 <sup>1]</sup>
	NH <sub>3</sub> -A	D5085755	Warning Marks
	Triethyl Amine-5	D5086816	0.25 ... 3
Arsine	Arsine-0.05	10072098	0.05 ... 1
<b>B</b> Benzene	Benzene-0.25 [specific]	D5086852	0.25 ... 10
	C <sub>6</sub> H <sub>6</sub> -1	D5086835	1... 25
	C <sub>6</sub> H <sub>6</sub> -5	D5085816	5... 100
	Aromatic HC	D5086811	5 ... 500
	Aromaten-A	D5085770	Warning Marks
Blistering Agents <i>see HD; HN; Lewisite</i>			
Bromine	Cl <sub>2</sub> -0.2	D5085801	0.2 ... 3
Blood; Choking Agents simultaneous measurement of:			
CG + DP [Phosgene + Diphosgene]			
AC [Hydrogen Cyanide]			
CK [Cyanogen Chloride]			
	CK, AC, DP, CG	D5086884	5 <sup>2]</sup> <sup>4]</sup>
Bromobenzene	Aromatic HC	D5086811	30 ... 720
Bromoethane	Trichloroethan-5	D5086834	15 ... 400
Bromomethane	Methyl Bromid-2 <sup>3]</sup>	D5086845	2 ... 100
	Methyl Bromid-200	D5086847	200... 8000
	Trichloroethan-5	D5086834	20... 270
Bromopropane, 1-	Trichloroethan-5	D5086834	3.5 ... 740
Butadiene, 1,3-	Ethylene-50	D5086833	100... 1200
Butane, n-	Propane-200	D5086831	200... 3800
Butyl Alcohol, iso-	Alcohol-A	D5085773	Warning Marks
	Ethanol-100	D5086818	150... 2900
Butyl Alcohol, n-	Alcohol-A	D5085773	Warning Marks
	Ethanol-100	D5086818	100... 3900
Butyl Alcohol, s-	Alcohol-A	D5085773	Warning Marks
	Ethanol-100	D5086818	300... 5100
Butyl Amine, n-	Triethyl Amine-5	D5086816	3 ... 36
Butyl Amine, s-	Triethyl Amine-5	D5086816	2... 18
Butyl Amine, t-	Triethyl Amine-5	D5086816	2... 14
Butyl Mercaptan, n-	Ethyl Mercaptan-0.5	D5086815	1.5... 15

<sup>1]</sup> = Vol.-% <sup>2]</sup> = mg/m<sup>3</sup> <sup>3]</sup> = Package includes 5 pre tubes and 5 detector tubes plus one piece of rubber <sup>4]</sup> = Lowest reaction value [indication only]

Substance measured	Detector tube applicable	Part No. [10 tubes/pkg]	Measuring range [ppm]
Butyl Mercaptan, t-	Ethyl Mercaptan-0.5	D5086815	0.8...5
Butene, 1-	Benzin-A	D5085769	Warning Marks
	Ethylene-50	D5086833	100...5000
Butene, 2-	Ethylene-50	D5086833	200...5000
	Benzin-A	D5085769	Warning Marks
<b>C</b> Carbonic Dichloride [Carbonyl Chloride] <i>see Phosgene</i>			
Carbon Dioxide	CO <sub>2</sub> -100	D5086814	100...3000
	CO <sub>2</sub> -0.1%	D5085817	0.1...7 <sup>1)</sup>
	CO <sub>2</sub> -0.5%	D5086844	0.5...10 <sup>1)</sup>
	CO <sub>2</sub> -1%	D5085841	1...20 <sup>1)</sup>
	CO <sub>2</sub> in biogas	10012107	5...40 <sup>1)</sup>
	CO <sub>2</sub> -HP	D5085848	100...2000
	CO <sub>2</sub> -A	D5085758	Warning Marks
Carbon Disulfide	CS <sub>2</sub> -2	D5085834	2...300
Carbon Monoxide	CO-5	D5085836	5...1000
	CO-10 [ppm]	D5085821	10...3000
	CO-10 [Vol.-%]	D5085820	0.001...0.3 <sup>1)</sup>
	CO-0.1%	D5085822	0.1...1.0 <sup>1)</sup>
	CO-3000	D5086839	3000...70000
	CO-0.5%	D5085835	0.3...7 <sup>1)</sup>
	CO-HP	D5085847	5...70
Chlorine	Cl <sub>2</sub> -0.2	D5085801	0.2...30
	ClO <sub>2</sub> -0.05	D5086812	1...46
	Cl <sub>2</sub> -50	D5086855	50...500
	Cl <sub>2</sub> -A	D5085757	Warning Marks
Chlorine Dioxide	ClO <sub>2</sub> -0.05	D5086812	0.05...15
Chlorobenzene	Aromatic HC	D5086811	40...610
	Chlorbenzol-10	D5093811	10...140
	CKW-A	D5085771	Warning Marks
Chlorobromomethane	Trichloroethane-5	D5086834	5...180
Chlorobutane, 1-	Trichloroethane-5	D5086834	5...170
Chloroethane	Trichloroethane-5	D5086834	50...800
Chloropentane, 1-	Trichloroethane-5	D5086834	5...550
Chloropropane, 1-	Trichloroethane-5	D5086834	5...220
Chloropropane, 2-	Trichloroethane-5	D5086834	8...1700
Cyanogen Chloride	Chlorcyan	D5093884	0.2...2
Cycloheptane	Hexane-20	D5086832	80...3300
Cyclohexane	Benzin-A	D5085769	Warning Marks
	Hexane-20	D5086832	20...3400
Cyclohexyl Amine	Triethyl Amine-5	D5086816	7...38
Cyclooctane	Hexane-20	D5086832	20...2100
Cyclopentane	Hexane-20	D5086832	80...2700
<b>D</b> Decane, n-	Hexane-20	D5086832	50...500
Dibromoethane, 1,2-	Trichloroethane-5	D5086834	25...700
Dibromomethane	Trichloroethane-5	D5086834	9...200
Dichlorobenzene, 1,2-	CKW-A	D5085771	Warning Marks
Dichloroethane, 1,1-	Trichloroethane-5	D5086834	8...300
	CKW-A	D5085771	Warning Marks
Dichloroethane, 1,2-	Dichloroethane-5	D5085823	30...720
	CKW-A	D5085771	Warning Marks

<sup>1)</sup> = Vol.-% <sup>2)</sup> = mg/m<sup>3</sup> <sup>3)</sup> = Package includes 5 pre tubes and 5 detector tubes plus one piece of rubber <sup>4)</sup> = Lowest reaction value [indication only]

Substance measured	Detector tube applicable	Part No. [10 tubes/pkg]	Measuring range [ppm]
Dichloroethylene, 1.1-	Trichloroethane-5	D5086834	10...600
Dichloroethylene, 1.2-	Trichloroethane-5	D5086834	10...500
Dichloromethane	Dichloromethane-50	D5085823	50...1000
	Dichloromethane-A	D5085772	Warning Marks
Dichloropropane, 1.2-	Trichloroethane-5	D5086834	5...440
Dichloropropane, 1.3-	Trichloroethane-5	D5086834	5...220
Diethyl Amine	Triethyl Amine-5	D5086816	3...27
Dimethyl Amine	Triethyl Amine-5	D5086816	3...27
Dimethylbutane, 2.2-	Hexane-20	D5086832	100...4900
Dimethyl Hydrazine	Hydrazine-0.1	D5086861	0.05...1.1
<b>E</b> Ethyl Acetate	Ethyl Acetate-200	10024253	200...3000
Ethyl Alcohol	Alcohol-A	D5085773	Warning Marks
	Ethanol-100	D5086818	100...6000
Ethyl Amine	Triethyl Amine-5	D5086816	4...55
Ethyl Benzene	Aromaten-A	D5085770	Warning Marks
	Tol.-5	D5085828	5...1800
<i>Ethanol see Ethyl Alcohol</i>			
Ethyl Mercaptan	Ethyl Mercaptan-0,5	D5086815	0.5...80
Ethylene	Ethylene-50	D5086833	25...5000
	Benzin-A	D5085769	Warning Marks
Ethylene Diamine	Triethyl Amine-5	D5086816	5...27
Extraction Gasolines	BNZ-Test	D5085807	qualitative
<b>F</b> Formaldehyde	Formaldehyde-0.1	D5086813	0.04...55
Formic Acid	Acetic Acid-1	D5086821	2...160
Furfuryl Alcohol	Phenol-1	D5086838	170...1500
<b>G</b> Gasoline	Gasoline-30	D5085898	30...6000
	BNZ-Test	D5085807	Warning Marks
<b>H</b> Heptane, all Isomers	BNZ-Test	D5085807	Warning Marks
	Heptane, n-	Hexane-20	D5086832
Hexane, all Isomers	Benzin-A	D5085769	Warning Marks
	BNZ-Test	D5085807	Warning Marks
Hexane, n-	Hexane-20	D5086832	20...3200
	Benzin-A	D5085769	Warning Marks
Hydrogene Chloride	Benzin-A	D5085769	Warning Marks
	HCl-1	D5085846	1...50
Hydrazine	HCl-50	D5086858	50...5000
	HCl-A	D5085762	Warning Marks
Hydrogen Cyanide	Hydrazine-0.1	D5086861	0.05...10
Hydrogen Fluoride	HCN-2	D5085824	2...50
	HCN-A	D5085756	Warning Marks
Hydrogen Sulfide	HF-1	D5086830	1...50
	H <sub>2</sub> S-0,1	10023818	0.1...6
Isobutane	H <sub>2</sub> S-1	D5085826	1...200
	H <sub>2</sub> S-100	D5085827	100...4000
	H <sub>2</sub> S-0.4%	D5086857	0.1...4 <sup>1)</sup>
	H <sub>2</sub> S-A	D5085764	Warning Marks
<b>I</b> Isobutyl Amine	Propane-200	D5086831	200...4200
Isobutylene	Triethyl Amine-5	D5086816	3...36
Isobutyl Methyl Ketone	Ethylene-50	D5086832	400...2600
	MEK-50	D5086837	50...400

<sup>1)</sup> = Vol.-% <sup>2)</sup> = mg/m<sup>3</sup> <sup>3)</sup> = Package includes 5 pre tubes and 5 detector tubes plus one piece of rubber <sup>4)</sup> = Lowest reaction value [indication only]

Substance measured	Detector tube applicable	Part No. [10 tubes/pkg]	Measuring range [ppm]
Isooctane	Hexane-20	D5086832	100... 3000
Isopropyl Amine	Triethyl Amine-5	D5086816	5 ... 30
Isopropyl Mercaptan	Ethyl Mercaptan-0.5	D5086815	0.5 ... 5.5
<b>K</b> Kerosine	BNZ-Test QL	D5085807 D5085810	Warning Marks qualitative
Ketones	QL	D5085810	qualitative
<b>L</b> Lewisite	Lewisite	D5086883	1 <sup>2)</sup> 4]
Lost, S-	HD	D5086882	3 <sup>2)</sup> 4]
Lost, S- + N-	HD, HN	D5086881	1 <sup>2)</sup> 4]
Light Fuels	BNZ	D5085807	Warning Marks
Ligroin	Gasoline-30 QL BNZ	D5085898 D5085810 D5085807	30... 6000 qualitative Warning Marks
Liquid Petroleum Gas	Propane-200 QL	D5086831 D5085810	200... 4000 [Propane] qualitative
<b>M</b> Mercaptans	Ethyl Mercaptan-0.5	D5086815	0.5 ... 100
Mercury	Hg-0.01	D5085843	0.1 ... 0.8 <sup>2)</sup> 0.01... 0.08
Methane	Erdgas	D5086846	Warning Marks
Methyl Alcohol	Ethanol-100 Methyl Alcohol-100 Alcohol-A	D5086818 D5094818 D5085773	100... 2350 100... 2500 Warning Marks
Methyl Amine	Triethyl Amine-5	D5086816	4 ... 55
Methyl Bromide	Methyl Bromide-2 <sup>3)</sup> Methyl Bromide-200	D5086845 D5086847	2 ... 100 200... 8000
Methyl Butane, 2-	Hexane-20	D5086832	50 ... 3000
Methyl Cyclohexane	Hexane-20	D5086832	80... 4900
Methyl Cyclopentane	Hexane-20	D5086832	150... 3700
Methyl Ethyl Ketone	MEK-50	D5086837	50... 4000
Methyl Hydrazine	Hydrazine-0.1	D5086861	0.2 ... 4
Methyl Mercaptan	Ethyl Mercaptan-0.5	D5086815	0.5 ... 5
Methyl Methacrylate	Acrolein-0,1 <sup>4)</sup>	10017882	1.5 ... 115
Methyl Pentane, 2-	Hexane-20	D5086832	150... 4500
Methyl Pentane, 3-	Hexane-20	D5086832	100... 3700
Mineralic Oil [Compressor Oil]	Oil-HP	D5085850	Warning Marks
Mustard Gases <i>see Lost</i>			
<b>N</b> Natural Gas	Erdgas	D5086846	Warning Marks
Nerve Agents <i>see Phosphoric Acid Esters</i>			
Nitrogen Dioxide	NO <sub>2</sub> -0.5 NO <sub>2</sub> -2	D5085805 D5085867	0.5 ... 50 2 ... 140
Nitrous Fumes	Nitr-0.5 Nitr-2 Nit-10 Nitr-50 Nitr-A Nitr-0.5 Nitr-2 Nitr-10 Nitr-50 Nitr-A	D5085818 D5085844 D5085808 D5085809 D5085760 D5085818 D5085844 D5085808 D5085809 D5085760	0.5 ... 50 2 ... 140 10... 300 50... 3000 Warning Marks 0.5 ... 50 2 ... 140 10... 300 50... 3000 Warning Marks

<sup>1)</sup> = Vol.-% <sup>2)</sup> = mg/m<sup>3</sup> <sup>3)</sup> = Package includes 5 pre tubes and 5 detector tubes plus one piece of rubber <sup>4)</sup> = Lowest reaction value [indication only]



Substance measured	Detector tube applicable	Part No. [10 tubes/pkg]	Measuring range [ppm]
Nonane, n-	Hexane-20 Benzin-A	D5086832 D5085769	50...2800 Warning Marks
<b>O</b> Octane, n-	Hexane-20 Benzin-A	D5086832 D5085769	50...3000 Warning Marks
Organic Arsenic Compounds <i>see Lewisite</i>			
Other Organic Compounds	QL	D5085810	qualitative
Ozone	Ozone-0.05	D5086828	0.05...5
<b>P</b> Pentachlorethane	Trichlorethane-5	D5086834	10...300
Pentane, n-	Hexane-20 Benzin-A	D5086832 D5085769	50...3900 Warning Marks
Petroleum Distillates	Gasoline-30 QL BNZ	D5085898 D5085810 D5085807	30...6000 qualitative Warning Marks
Petroleum Ether	BNZ	D5085807	Warning Marks
Phenol	Phenol-1	D5086838	1...25
Phosgene	Phosgene-0.1 Phosgene-A	D5085854 D5085761	0.1...20 Warning Marks
Phosphine	PH <sub>3</sub> -0.05 PH <sub>3</sub> -0.1 PH <sub>3</sub> -50	D5085829 D5085830 D5085831	0.05...3.0 0.1...100 5...2000
Phosph. Acid Esters	Phosph. Acid Esters	D5086880	0.01 <sup>2)4)</sup>
Propane	Propane-200	D5086831	200...4000
Propenal, -2 <i>see Acrolein</i>			
Prussic Acid <i>see Hydrogene Cyanide or CK, AC, DP, CG</i>			
Propyl Alcohol, iso-	Ethanol-100 Alcohol-A	D5086818 D5085773	200...5000 Warning Marks
Propyl Alcohol, n-	Ethanol-100 Alcohol-A	D5086818 D5085773	100...3000 Warning Marks
Propyl Amine, iso-	Triethyl Amine-5	D5086816	5...30
Propyl Amine, n-	Triethyl Amine-5	D5086816	2...28
Propyl Mercaptan, iso-	Ethyl-Mercaptane-0.5	D5086815	0.7...8
Propyl Mercaptan, n-	Ethyl-Mercaptane-0.5	D5086815	0.7...8
Propylene	Ethylene-50 Benzin-A	D5086833 D5085769	20...5000 Warning Marks
<b>S</b> Scentinel E	Ethyl Mercaptane-0.5	D5086815	0.5...30
Styrene	Styrene-10	D5086819	10...300
Sulfur Dioxide	SO <sub>2</sub> -1 SO <sub>2</sub> -5 SO <sub>2</sub> -100 SO <sub>2</sub> -A	D5085803 D5085813 D5085825 D5085763	0.5...30 5...120 100...4000 Warning Marks
<b>T</b> Tetrabromoethane, 1,1,2,2-	Trichloroethane-5	D5086834	5...200
Tetrachloroethane, 1,1,2,2-	Trichloroethane-5	D5086834	50...1000
Tetrachloroethylene	Per-5 Per-10 CKW-A	D5085865 D5085840 D5085771	5...200 10...500 Warning Marks
Tetrahydrofuran	Ethanol-100	D5086818	30-980
Tetrahydrothiophene <sup>c</sup>	THT-1	D5085866	1...10 <sup>1)</sup> 5...35 <sup>1)</sup>

<sup>1)</sup> = Vol.-% <sup>2)</sup> = mg/m<sup>3</sup> <sup>3)</sup> = Package includes 5 pre tubes and 5 detector tubes plus one piece of rubber <sup>4)</sup> = Lowest reaction value [indication only]

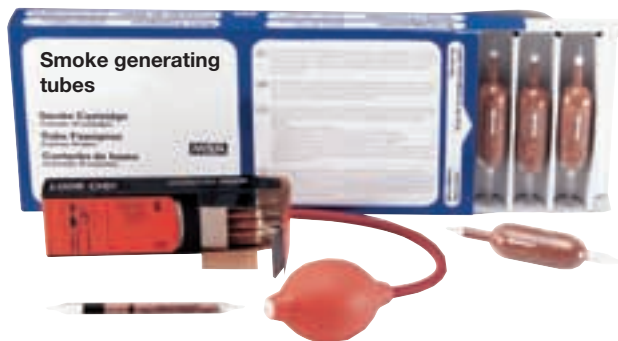
Substance measured	Detector tube applicable	Part No. [10 tubes/pkg]	Measuring range [ppm]	
Toluene	Tol-5	D5085828	5...1000	
	Aromatic HC	D5086811	30...750	
	Aromatic-A	D5085770	Warning Marks	
Tribromomethane	Trichloroethane-5	D5086834	7...200	
Trichloroethane, 1,1,1-	Trichloroethane-5	D5086834	5...1500	
Trichloroethane, 1,1,2-	Trichloroethane-5	D5086834	10...170	
Trichloroethylene	Tri-5	D5085842	5...250	
	CKW-A	D5085771	Warning Marks	
Trichloromethane	Trichloroethane-5	D5086834	8...100	
Trichloropropane, 1,2,3-	Trichloroethane-5	D5086834	10...1200	
Triethyl Amine	Triethyl Amine-5	D5086816	5...30	
Trimethyl Amine	Triethyl Amine-5	D5086816	5...30	
Trimethyl Pentane, 2,2,4-	Hexane-20	D5086832	100...3000	
<b>V</b> Vinyl Chloride	VC-1	D5085837	1...70	
	CKW-A	D5085771	Warning Marks	
<b>W</b> Water Vapour	H <sub>2</sub> O-HP [mg/m <sup>3</sup> ]	D5085849	5...160 <sup>1)</sup>	
	H <sub>2</sub> O-HP [ppm]	D5085851	10...200	
	H <sub>2</sub> O-MP	D5086851	100...1000 <sup>1)</sup>	
	H <sub>2</sub> O [r.h. %]	D5086849	10...100	
<b>X</b> Xylene	Aromatic HC	D5086811	50...630	
	Xylene, 1,2-	Tol-5	D5085828	5...2500
		Aromatic HC	D5086811	50...630
	Aromatic-A	D5085770	Warning Marks	
Xylene, 1,3-	Tol-5	D5085828	5...2500	
	Aromatic HC	D5086811	50...630	
	Aromatic-A	D5085770	Warning Marks	
Xylene, 1,4-	Tol-5	D5085828	5...1200	
	Aromatic HC	D5086811	50...630	
	Aromatic-A	D5085770	Warning Marks	
<b>Y</b> Yperite <i>see Lost</i>				

Substance measured	Detector tube applicable	Part No. [200 tubes/pkg]	Measuring range [ppm]
Carbon Dioxide	CO <sub>2</sub> -0.1%	D5085917	0.1...7.0 <sup>2)</sup>
Carbon Dioxide	CO <sub>2</sub> -1%	D5085941	1...20 <sup>2)</sup>
Carbon Monoxide	CO-5	D5085936	5...1000
Carbon Monoxide	CO-10 [Vol.-%-scale]	D5085920	0.001...0.3 <sup>2)</sup>
Carbon Monoxide	CO-10 [ppm-scale]	D5085921	10...3000
Hydrogen Sulfide	H <sub>2</sub> S-1	D5085926	1...200
Hydrogen Sulfide	H <sub>2</sub> S-100	D5085927	100...4000
Phosphine	PH <sub>3</sub> -0.1	D5085930	0.1...100
Phosphine	PH <sub>3</sub> -50	D5085931	50...2000

<sup>1)</sup> = Vol.-% <sup>2)</sup> = mg/m<sup>3</sup> <sup>3)</sup> = Package includes 5 pre tubes and 5 detector tubes plus one piece of rubber <sup>4)</sup> = Lowest reaction value [indication only]

# Ventilation Smoke Tubes

[ Indicating air flow patterns ]



Smoke tube [not corrosive] and rubber aspirator bulb

Application	Type	Part No.
To identify air flow patterns and leaks [10 tubes/pkg]	Smoke generating tubes	D5019701
Kit of 1 package smoke generating tubes and manual smoke pump in plastic carrying case [10 tubes/pkg]	Smoke generating kit	D5019702
For ventilation testing, leak testing of pipelines, burners, windows and mining ventilation [10 tubes/pkg]	Smoke generating cartridges	D6009000
Plastic tube contains two glass ampoules with different chemicals [Ethylenediamine and Acetic Acid] to produce non-corrosive smoke to identify air flow patterns and leaks [12 tubes/pkg]	Ventilation smoke tube [not corrosive]	D5019708
Kit of smoke tubes and a hand-held rubber aspirator bulb contained in a plastic carrying case [6 tubes/pkg]	Ventilation smoke tube kit [not corrosive]	D5019709
Especially for smoke generation with ventilation smoke tubes also for other smoke generating tubes	Rubber aspirator bulb [not corrosive]	D5019710
Pump for smoke tubes	Manual smoke pump	D5019903
Pump for smoke tubes and -cartridges [Toximeter II]	Electronically smoke pump	D5142705

## Tubes for Special Applications

Application	Type	Part No.
Universal Tube [qualitative] for a large number of gases and vapours [10 tubes/pkg]	Qualitest QL	D5085810
Filter tube to adsorb interfering substances [10 tubes/pkg]	Filter tube Ads	D5085832

# Indoor Air Set

[ Quick check for indoor air quality ]



Indoor Air Set with detector tube pump Gas-Tester

The Indoor Air Set provides a quick assessment and a first information of the indoor environment in a wide variety of workplaces offices and other rooms.

A box of Indoor Air Set is containing 2 each detector tubes of CO-5, CO<sub>2</sub>-100, Ozone 0.05, Formaldehyd 0.1 and a detector tube for testing the humidity level. In addition, a thermometer [testing strip] is on the side of each package. Room temperature is indicated with the testing strip from 14 °C...31 °C or 58 °F...88 °F.

For additional measurements use MSA sorbent tubes with connected analysis in a chemical laboratory.

A detector tube pump is necessary for the use of detector tubes [MSA Gas-Tester, Gas-Tester II H, Toximeter II – see pages 3 and 4].

Detector tube	Measuring range	Description
CO	5...1000 ppm	Smokers, lorries and forklifts or other combustion engines inside the building
CO <sub>2</sub>	10... 3000 ppm	Overall indicator of indoor air quality, levels above 1000 ppm indicate a ventilation problem
Formaldehyde	0.1 ...10 ppm	Smoke from cigarettes, new carpets, particle boards
Ozone	0.05... 5 ppm	Copy machines, environmental air
Humidity	10...100% rel. H.	Low humidity can cause irritated eyes and sinus problems

## [ Ordering Information ]

Indoor Air Set	D5086848
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# PromilleTest

[ Alcohol Test Breathalyser Tubes ]

The Alcohol Test Breathalyser Tubes enables the alcohol content in blood to be determined reliably and easily. These tubes are used for precautionary check after alcohol consumption or residual alcohol before driving as well as check of alcohol prohibition as applicable to certain occupational activities.

The basic principle behind the test rests on the fact that a legally determined relationship exists between the alcohol content in exhaled breath and the alcohol content in the blood.

The test provides an analysis of alcohol in blood values from 0.5, 0.8 and 1.0 promille [0.05%, 0.08% and 0.1%]. The official alcohol limit values of 0.5 and 0.8 promille are marked on the detector tubes.

The contents of the package enable ten alcohol readings to be taken and consists of the following parts:

- 10 breathalyser test tubes
- 10 hygienically packed mouth pieces
- 1 breath bag for the measurement of volume
- 2 glass files [on the side of the plastic case]
- 1 set of instructions

## [ Ordering Information ]

D5091770 PromilleTest
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# Airtester HP, MP and Detector Tubes

[ Monitoring compressed air for breathing apparatus ]



Airtester HP  
connected to pressure cylinder



Airtester HP Set  
with carrying case

In conjunction with Airtester HP [high pressure 200 bar and 300 bar] or Airtester MP [medium pressure up to 10 bar; 145 psi] the HP and MP Detector Tubes are used to monitor the purity of breathing air as supplied from compressors, pressure cylinders or medium pressure air lines.

The HP and MP Detector Tubes can indicate quickly and quantitatively the concentration of water vapour, oil, carbon dioxide, carbon monoxide, nitrous fumes according to quality requirements of European Standard DIN EN 12021 [01/99].

## [ Detector Tubes ]

Substance measured	Detector tube applicable	Part No. [10 tubes/pkg]	Measuring range [ppm]	Threshold value acc. EN 12021
Carbon dioxide	CO <sub>2</sub> -HP	D5085848	100... 2000 ppm	500 ppm
Carbon monoxide	CO-HP	D5085847	5 ... 70 ppm	15 ppm
Mineral oil vapour	Öl-HP	D5085850	Two markings 0.3 mg/m <sup>3</sup> – 60 <sup>2)</sup> 0.5 mg/m <sup>3</sup> – 25 <sup>1)</sup> 0.5 mg/m <sup>3</sup> – 60 <sup>2)</sup> 1.0 mg/m <sup>3</sup> – 25 <sup>1)</sup>	0.5 mg/m <sup>3</sup>
Oil-HP synth.		10040887	depends on oil type	
Nitrous fumes [NO + NO <sub>2</sub> ]	Nitr.-HP	D5086850	0.2–6.0 ppm	not hazardous
Water vapour	H <sub>2</sub> O-HP [mg/m <sup>3</sup> ] H <sub>2</sub> O-HP [ppm] H <sub>2</sub> O-MP [mg/m <sup>3</sup> ]	D5085849 D5085851 D5086851	5 ... 160 mg/m <sup>3</sup> 10 ... 200 ppm 100 ... 1000 [mg/m <sup>3</sup> ]	25 mg/m <sup>3</sup>

## [ Airtester ]

Type	Part No.	Description
Airtester HP	D3188701	Sampling system [complete set for high pressure]
Airtester MP	D5185710	Sampling system [complete set for medium pressure]

<sup>1)</sup> 25 l Testing air

<sup>2)</sup> 60 l Testing air

# Carrying and Measuring Cases

[ Robust and flexible ]

## [ Carrying Cases ]

Made of plastic coated fibre boards, edges and corner protected by plastic. Without special interior equipment for the accommodation of the devices. Special inlays on request.

D5185911 Carrying case, size 1  
250 x 400 x 175 mm [H x L x W], weight: 2 kg

10012103 Carrying case, size 2  
320 x 460 x 170 mm [H x L x W], weight: 4,3 kg

The size of the carrying case depends on the desired configuration. Appropriate supply on request.



Carrying cases for detector tube and personal protection equipment, portable instruments etc.

## [ Measuring Cases ]

The measuring cases are configured with specific instruments and accessories according to the required measuring functions.

Examples:

- Detector tube pump
- Different boxes of detector tubes
- Sampling hose
- Smoke generating tubes
- Sorbent tubes and sampling pump
- Gas mask and filter
- Gloves
- Goggles
- Portable instruments for combustible and toxic gases and vapours

# Detector Tubes

[ for indication of ultra toxic chemicals ]

The highly sensitive detector tubes are designed for evaluation of the potential presence of ultra toxic chemical substances in the air and are resistant to interfering substances. These detector tubes are widely used for special investigation and inspection groups, chemical corps, fire brigades and for use in agricultural research chemical industries and chemical agent incineration plants for the detection of chemical warfare agents, pesticides or reagents for chemical synthesis.



MSA detector tubes for indication of ultra toxic compounds

Detector tube	Substance to be detected	Max. sensitivity [mg/m <sup>3</sup> ] <sup>1</sup>	Max. pump strokes	Part No. [10 tubes/pkg]
Phosphoric Acid Esters	Soman, Tabun, Sarin, VX	0.01	10	D5086880
HD, HN	S-Lost, N-Lost	1	30	D5086881
HD	S-Lost [only]	3	50	D5086882
Lewiste [L]	2-Chlorovinyl-dichloro arsine	1	30	D5086883
CK, AC, DP, CG	Cyanogen Chloride Hydrogen Cyanide Diphosgene Phosgene	5	30	D5086884

<sup>1</sup> Lowest reaction value [indication only].

**Note:** For export of detector tubes for ultra toxic compounds observe legal regulations of individual export licence.

# Action Detector Tubes

[ Fast evaluation of dangerous situations ]



A quick evaluation of the potential danger resulting from fires, accidents and other disasters is achieved with the Action Detector Tubes.

A special calibration permits the use of most of the Action tubes with only two pump strokes. To ensure a fast and simple reading only two warning markings are printed on the Action Tubes.

A third mark "ETW" is newly printed on the Action tubes. ETW means "Einsatz-toleranzwert" according to the German guide-line vfdB 10/01 [03/03].

The guide-line is published by "Vereinigung zur Förderung des Deutschen Brandschutzes e.V." In case of concentration above ETW for more than 4 hours respiratory protective devices are required. ETW are established for 33 substances.

Substance measured	Action det. tube applicable	Part No. [10 tubes/pkg]	1. Warn. mark [ppm]	2. Warn. mark [ppm]	ETW mark [ppm]	Number of strokes [n]
<b>Action Detector Tubes</b>						
Ammonia	NH <sub>3</sub> -A	D5085755	50	250	110	2
Hydrogen Cyanide	HCN-A	D5085756	10	50	3,5	2
Chlorine	Cl <sub>2</sub> -A	D5085757	0.5	2,5	1	2
Carbon dioxide	CO <sub>2</sub> -A	D5085758	5000	25000	10000	2
Carbon monoxide	CO-A	D5085759	30	150	33	2
Nitrous gases	NO <sub>2</sub> -A	D5085760	5	25	8.2 [NO <sub>2</sub> ]	2
Phosgene	Phosgen-A	D5085761	0.02	–	0.08	5
Hydrochloric acid	HCl-A	D5085762	5	25	5.4	2
Sulfur dioxide	SO <sub>2</sub> -A	D5085763	0.5	2.5	1	2
Hydrogen sulfide	H <sub>2</sub> S-A	D5085764	10	50	20	2
Gasoline hydrocarbons [n-Hexane]	Benzin-A	D5085769	50	250	200	2
Aromatic hydrocarbons [Toluene]	Aromaten-A	D5085770	50	250	94	2
Halogenated hydrocarbons [easily decomposable] [Trichloroethylene]	CKW-A	D5085771	50	150	100	2
Dichloromethane	Dichlormethan-A	D5085772	100	500	–	5
Alcohols [Methanol]	Alkohol-A	D5085773	200	1000	720	5

	Part-No.	Description
<b>Action Detector Tubes Assortments</b>		
Action detector tubes assortment 1	D5085752	One tube each of the types D5085755 to D5085764
Action detector tubes assortment 2	D5085753	Two tubes each of types D5085769 to D5085773
Detector tube Qualitest	D5085810	Detector tube for qualitative detection of the atmosphere for reducing and organic gases and vapours
<b>Action Kit</b>		
Action kit [Gas-Tester II H]	D5146803	Containing 15 packages of action detector tubes, 1 package Qualitest, 1 Gas-Tester II H, sampling line and action detector tube measurement scheme
Carrying case	D5146914	To be filled as required with up to 24 packages of detector tubes respectively sampling line and a detector tube pump
Action detector tube measurement scheme	D5146054	
<b>Trainer Tube Assortment</b>		
Trainer tube assortment	D5019703	Kit of tubes containing substances for training and test purposes for handling of detector tubes [e.g. for simulation of unknown gas mixtures]

# Sampling Kit

[ for SF<sub>6</sub> decomposition products ]

Detection tube SF<sub>6</sub> decomposition products in conjunction with the sampling system [pressure reducer] is used to analyse the content of decomposition products in SF<sub>6</sub> isolation gas used in high voltage switch gear and other electrical installations.

A special pressure reducer is attached to the installation to be monitored which results in a constant volume flow through the detector tube attached downstream.



Application	Type	Part No. [10 tubes/pkg]
0.5–15 ppm [SO <sub>2</sub> ]	Detector tube SF <sub>6</sub> decompo- sition products	D5085838
Sampling system [reducer] for the measurement of SF <sub>6</sub> decomposition products in a complete set [see figure above]	Sampling Kit [complete]	D5185700

# Biogas-Reactor Kit

[ Simple way of monitoring fermentation processes ]



An easy and cost effective method of monitoring the fermentation in biogas reactors is possible with the Biogas-Reactor Kit. The kit contains a calibrated syringe [sample volume 15 ml] and a package of ten detector tubes for measuring carbon dioxide in the range of 5 Vol.-% up to 40 Vol.-%. The main components of biogas CO<sub>2</sub> and methane will be calculated as difference from measured CO<sub>2</sub> value and 100 Vol.-%. Other components of interest, e.g. hydrogen sulfide in trace amounts, can be measured with standard type detector tubes.

## [ Ordering Information ]

10012107 Biogas-Reactor Kit  
Calibrated syringe and package of 10 detector  
tubes carbon dioxide 5–40 Vol.-%



# Water Analysis Kit

[ for volatile substances ]



The water analysis kit permits a quick and easy determination of volatile substances such as perchloroethylene, benzene, etc., in a water sample.

The method of analysis is based on the extraction of the hazardous substance from the water sample. The combination of gas washing bottle with detector tube and pump results in a colour change in the detector tube if the hazardous substance is present. Using a special formula, the reading [in ppm] of the detector tube indication can be used to determine the concentration of the hazardous substance [in mg/l] in the water sample; depending on the temperature of the water.

A detector tube pump is necessary for the use of detector tubes [MSA Gas-Tester, Gas-Tester II H, Toximeter II – see pages 3 and 4].

Substance measured	Detector tube	Measuring range [mg/l]	Number of strokes [n]	Part No. [10 tubes/pkg]
Benzene	C <sub>6</sub> H <sub>6</sub> -5	0.5 ... 5.0	5	D5085816
Toluene	Tol.-5	1.0 ... 25	5	D5085828
Petrol/Gasoline	Ethylene-50	3.0 ... 30	6	D5086833
Perchloroethylene	a) Per-5	0.5 ... 10	8	D5085865
	b) Kombination: Cl <sub>2</sub> -0,2 combined with a special pre tube Perchloroethylene	0.1 ... 2.5	4; 8	D5085801
				D5086801
Trichloroethylene	Tri-5	0.1...1.0	6	D5085842
1,1,1-Trichloroethane	a) Trichlorethan-5	5 ... 30	5	D5086834
	b) Kombination: Cl <sub>2</sub> -0,2 combined with a special pre tube Perchloroethane	0.5 ... 2.0	2	D5085801
				D5086802

## [ Ordering Information ]

D5146731	Water analysis kit, complete, with: cleaning wash bottle [with insert]; thermometer [0...100 °C]; measuring jug; calculator; pencil and instruction sheet; test protocol; measuring instructions; activated carbon tube
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# Active Sampling Systems for hazardous substances

## [ Sorbent tubes and supplies ]



ESCORT ELF and DigiCal



ESCORT ELF 3.5 and Dust Filter Cassette [BIA-Type]

A suitable sorbent tube – depending on type and concentration of the substance to be measured – is connected to the sampling pump “ESCORT ELF” with a sampling device such as the “GEMINI-Twin-Port Sampler”.

The hazardous substance is concentrated on the sorbent material; specific adsorption tubes may be required for special measurement applications.

The automatically controlled flow range of ESCORT ELF is 0.5 up to 3.0 l/m. The new sampling pump ESCORT ELF 3.5 with the automatically controlled flow range 1.0 up to 3.5 l/m is designed for use with sorbent tubes as well as most dust sampling tasks.

With the “Gemini” Sampler in conjunction with ESCORT ELF or ESCORT ELF 3.5 it is possible to simultaneously use different sorbent tubes [independent of the flow volume of the pump], thereby creating a more efficient sampling system for hazardous substances.

### [ Sampling Pump ]

D6170721 ESCORT-ELF Pump with OMEGA Charger

D6170722 ESCORT-ELF Pump without OMEGA Charger

D6170725 ESCORT ELF 3.5 with OMEGA Charger

D6170726 ESCORT ELF 3.5 without OMEGA Charger

D5142705 Toximeter II

### [ Sampling Kit/Tubes Holders ]

D6170705 GEMINI Twin-Port Sampling Kit, includes: GEMINI Sampler, tube protectors, Y-connector, clips and carrying case

### [ Sorbent Tubes ]

Part.-No.	Adsorbens	Type	SL/CL* mg	No. of package
D5086740	Charcoal	B	300/600	10
D5086940	Charcoal	B	300/600	180
D6103740	Charcoal	BIA	300/600	10
D6103940	Charcoal	BIA	300/600	180
D5086741	Charcoal	G	600/300	10
D5086742	Silicagel	B	550/900	10
D5086942	Silicagel	B	550/900	180
D5086743	Silicagel	G	900/550	10
D5086742	Silicagel	BIA	500/1000	10
D5086942	Silicagel	BIA	500/1000	180
D6103730	Charcoal	NIOSH	100/50	10
D6103930	Charcoal	NIOSH	100/50	50
D6103731	Silicagel	NIOSH	150/75	10
D6103931	Silicagel	NIOSH	150/75	50
D6103732	Florisil	NIOSH	100/50	10
D6103932	Florisil	NIOSH	100/50	50
D6103733	Tenax	NIOSH	30/15	10
D6103933	Tenax	NIOSH	30/15	50
D6103735	XAD-2	NIOSH	100/50	10
D6103935	XAD-2	NIOSH	100/50	50
D6103736	Florisil	NIOSH	400/200	10
D6103936	Florisil	NIOSH	400/200	50
D6103738	Mol sieve 5Å	NIOSH	150/-	10

\*SL = Sorbent layer / CL = Control layer

### [ Replacement and Parts ]

D6170760 DELTA Charger [for Toximeter II]

D6170724 OMEGA II Charger [for ESCORT ELF and Toximeter II]

D6170710 Battery pack with O-ring

D6170703 220 V single unit OMEGA Charger

D6170712 One replacement inlet filter

D6170711 ESCORT ELF Pump Overhaul Kit [contains common components needed for routine maintenance]

D6170706 DigiCal Flow Indicator, primary standard with measuring range 1–6000 ml/min.

## Interchangeability of MSA Detector Tubes and Pumps with other Manufacturers' Tubes and Pumps

The use of detector tubes in equivalent manually operated pumps from other manufacturers is permissible if the following criteria is met:

- The characteristics of the pump [volume per stroke, sampling time, and flow] must be within the same accuracy range.
- The detector tubes must have an outer diameter of 7 mm and be factory calibrated with a pump that meets the criteria of [1] above.
- Manufacturer of tubes and pumps must operate under a certified quality assurance program.

## [ Units of Measure ]

Apart from Vol.-% and  $\text{mg}/\text{m}^3$  the concentration of gases and vapours is also commonly expressed as ppm [part per million].

The following relation exists between  $\text{ml}/\text{m}^3$  and Vol.-%:

$$\begin{aligned} 1 \text{ ppm} &\triangleq 1 \text{ ml}/\text{m}^3 \\ 10000 \text{ ppm} &\triangleq 1 \text{ Vol.-%} \\ 1 \text{ ppm} &\triangleq 1 \text{ mg}/\text{m}^3 \cdot \frac{\text{Mol.-Vol.}}{\text{Mol.-W.}} \quad \text{under normal conditions} \end{aligned}$$

## [ Remark ]

Further technical information is available for the following products and applications:

- Toximeter II



Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.



**UK Office**

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Please note - Product designs and specifications are subject to change without notice. The user is responsible for determining the suitability of this product.