

## Appendix 2. List of substances to be measured and Gastec detector tubes to be used

- (1) Detector tubes are listed in the order of the measuring range (from higher to lower concentrations)  
 (2) Standard detector tubes precede special detector tubes.  
 (3) Detector tube numbers in bold letters show that these detector tubes measure the substance as their prime target substance.

(4) Abbreviations

Dosi: Dosi-tube  
 Inject: Injection-type detector tube  
 Odour: Odorant detector tube  
 Poly: Polytec tube  
 Auto: Detector Tube for Automatic Gas Sampling Pump

Pyro:Pyrotube  
 S-ion: Sulphide ion detector tube  
 T-Sulph: Total Sulphide detector tube  
 Air: Airtec tube

Substance to be measured			Detector tube to be used		
Substance name	Page	Chemical formula	Tube number	Measuring range	Page
A Acetaldehyde	7-5	CH <sub>3</sub> CHO	<b>92</b>	5 to 750 ppm	2-8
			<b>92M</b>	2.5 to 100 ppm	2-9
			<b>92L</b>	1 to 20 ppm	2-10
			<b>91D (Dosi)</b>	0.1 to 20 ppm	4-14
			<b>151D (Dosi)</b>	4 to 1200 ppm	4-5
Acetic acid	7-5	CH <sub>3</sub> CO <sub>2</sub> H	<b>152D (Dosi)</b>	1.2 to 360ppm	4-20
			<b>81</b>	1 to 100 ppm	2-11
			<b>81L</b>	0.125 to 25 ppm	2-12
			<b>81D (Dosi)</b>	0.5 to 100 ppm	4-4
Acetic anhydride	7-6	(CH <sub>3</sub> CO) <sub>2</sub> O	<b>81</b>	0.6 to 15 ppm	2-11
			<b>81L</b>	0.15 to 6 ppm	2-12
			<b>81D (Dosi)</b>	0.3 to 60 ppm	4-4
Acetone	7-6	CH <sub>3</sub> COCH <sub>3</sub>	<b>151</b>	0.05 to 2 %	2-13
			<b>151L</b>	50 to 12000 ppm	2-14
			<b>151D (Dosi)</b>	5 to 1500 ppm	4-5
			<b>151TP (Auto)</b>	25 to 800 ppm	3-39
			<b>152D (Dosi)</b>	1.4 to 420 ppm	4-20
Acetone cyanohydrin	—	(CH <sub>3</sub> ) <sub>2</sub> C(OH)(CN)	<b>12L</b>	2.88 to 69 ppm	2-120
Acetonitrile	—	CH <sub>3</sub> CN	<b>52 (Pyro)</b>	3 to 180 ppm	3-7
Acetylene	7-7	HC≡CH	<b>171</b>	0.05 to 4 %	2-15
			<b>103</b>	0.075 to 3.6 %	2-113
			<b>172</b>	32.5 to 1040 ppm	2-93
Acid gases	—	—	<b>80</b>	1 to 80 ppm	2-16
Acrolein	7-7	CH <sub>2</sub> : CHCHO	<b>93</b>	3.3 to 800 ppm	2-17
Acrylic acid	—	CH <sub>2</sub> : CHCO <sub>2</sub> H	<b>81</b>	2 to 50ppm	2-11
			<b>81L</b>	0.45 to 18 ppm	2-12
Acrylonitrile	7-8	CH <sub>2</sub> : CHCN	<b>102L</b>	0.06 to 1.44 %	2-110
			<b>191</b>	2 to 360 ppm	2-18
			<b>191L</b>	0.1 to 18 ppm	2-19
Aliphatic hydrocarbon	—	—	<b>140</b>	6 to 3000 ppm	2-20
Allyl amine	—	CH <sub>2</sub> : CHCH <sub>2</sub> NH <sub>2</sub>	<b>180</b>	8.5 to 170 ppm	2-21
			<b>180L</b>	0.4 to 8 ppm	2-22
Ally Isothiocyanate	—	CH <sub>2</sub> : CHCH <sub>2</sub> NCS	<b>149</b>	5 to 200 ppm	2-171
Allyl chloride	—	CH <sub>2</sub> : CHCH <sub>2</sub> Cl	<b>101L</b>	0.1 to 3.4 %	2-108
			<b>131L</b>	3.2 to 48 ppm	2-222
Amines	—	R·NH <sub>2</sub>	<b>180</b>	5 to 100 ppm	2-21
			<b>180L</b>	0.5 to 10 ppm	2-22
Ammonia	7-8	NH <sub>3</sub>	<b>3H</b>	0.2 to 32 %	2-23

Substance to be measured			Detector tube to be used					
Substance name	Page	Chemical formula	Tube number	Measuring range	Page			
Ammonia (contd.)			3HM	0.05 to 3.52 %	2-24			
			3M	10 to 1000 ppm	2-25			
			3La	2.5 to 200 ppm	2-26			
			3L	0.5 to 78 ppm	2-27			
			180	1.5 to 30 ppm	2-21			
			3S (Odour)	0.5 to 5 ppm	3-66			
			3D (Dosi)	2.5 to 1000 ppm	4-6			
			3DL (Dosi)	0.1 to 10 ppm	4-7			
Amyl acetate	7-9	CH <sub>3</sub> CO <sub>2</sub> (CH <sub>2</sub> ) <sub>4</sub> CH <sub>3</sub>	147	10 to 200 ppm	2-28			
Aniline	7-9	C <sub>6</sub> H <sub>5</sub> NH <sub>2</sub>	181	1.25 to 60 ppm	2-29			
Arsine	7-10	AsH <sub>3</sub>	19LA	0.04 to 10 ppm	2-31			
Aromatic Hydrocarbons	—	—	120	0.4 to 200 ppm	2-30			
ⓑ Benzaldehyde	—	C <sub>6</sub> H <sub>5</sub> CHO	91L	4 to 92 ppm	2-105			
Benzene	7-10	C <sub>6</sub> H <sub>6</sub>	171	0.03 to 0.6 %	2-15			
			121S	2 to 312 ppm	2-32			
			121	2.5 to 120 ppm	2-33			
			121SL	1 to 100 ppm	2-34			
			121L	0.1 to 65 ppm	2-35			
			121SP	0.2 to 66 ppm	2-36			
			122DL (Dosi)	2.4 to 600 ppm	4-26			
			121P (Auto)	250 to 3000 µg/m <sup>3</sup>	3-40			
			Benzyl bromide	—	C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> Br	136L	10 to 100 ppm	2-156
			Benzyl chloride	7-11	C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> Cl	132L	1.6 to 20 ppm	2-217
			Boron trichloride	—	BCl <sub>3</sub>	12L	0.5 to 20 ppm	2-120
			Bromine	7-11	Br <sub>2</sub>	8La	0.05 to 0.8 ppm	2-72
Bromoform	—	CHBr <sub>3</sub>	136L	1 to 50 ppm	2-156			
1, 3-Butadiene	7-12	CH <sub>2</sub> :CHCH:CH <sub>2</sub>	174	50 to 800 ppm	2-37			
			174L	2.5 to 100 ppm	2-38			
			174LL	0.5 to 5 ppm	2-39			
			174D (Dosi)	1.3 to 200 ppm	4-8			
Butane	7-12	C <sub>4</sub> H <sub>10</sub>	103	0.035 to 1.68 %	2-113			
			104	25 to 1400 ppm	2-37			
1-Butanol	7-13	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> OH	114	10 to 150 ppm	2-41			
2-Butanol	7-14	CH <sub>3</sub> CH <sub>2</sub> CH(OH)CH <sub>3</sub>	115	5 to 150 ppm	2-42			
Butyl acetate	7-13	CH <sub>3</sub> CO <sub>2</sub> (CH <sub>2</sub> ) <sub>3</sub> CH <sub>3</sub>	142	0.05 to 0.8 %	2-43			
			142L	10 to 300 ppm	2-44			
			142L	7 to 210 ppm	2-44			
Butyl acrylate	—	CH <sub>2</sub> :CHCO <sub>2</sub> C <sub>4</sub> H <sub>9</sub>	142L	7 to 210 ppm	2-44			
tert-Butyl alcohol	—	(CH <sub>3</sub> ) <sub>3</sub> COH	102L	0.05 to 1.2 %	2-110			
Butylamine	—	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> NH <sub>2</sub>	180	8 to 160 ppm	2-21			
			180L	0.55 to 11 ppm	2-22			
tert-Butylamine	—	(CH <sub>3</sub> ) <sub>3</sub> CNH <sub>2</sub>	180	5.5 to 110 ppm	2-21			
n-Butyl bromide	—	C <sub>4</sub> H <sub>9</sub> Br	136H	24 to 360 ppm	2-155			
			136L	10 to 100 ppm	2-156			
			136LA	1 to 43.2 ppm	2-157			
Butyl mercaptan	—	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> SH	70L	0.16 to 12.8 ppm	2-149			
tert-Butyl mercaptan	—	(CH <sub>3</sub> ) <sub>3</sub> CSH	75	2.5 to 150 mg/m <sup>3</sup>	2-45			
			75L	0.5 to 30 mg/m <sup>3</sup>	2-46			
			77	1 to 15 mg/m <sup>3</sup>	2-47			
			70L	0.1 to 8 ppm	2-149			
Butyric acid	—	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CO <sub>2</sub> H	81L	0.325 to 13 ppm	2-12			
Butyronitrile	—	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CN	191L	6 to 180 ppm	2-19			

Substance to be measured			Detector tube to be used		
Substance name	Page	Chemical formula	Tube number	Measuring range	Page
☐ Carbon dioxide	7-14	CO <sub>2</sub>	2HH	2.5 to 40 %	2-48
			2H	0.5 to 20 %	2-49
			2L	0.13 to 6 %	2-50
			2LL	300 to 5000 ppm	2-51
			2LC	100 to 4000 ppm	2-52
			2HT (Inject)	10 to 100 %	3-36
			2D (Dosi)	0.02 to 12 %	4-9
			2A (Air)	250 to 3000 ppm	3-12
			2Ag (Air)	200 to 3000 ppm	3-13
			Carbon disulphide	7-15	CS <sub>2</sub>
13	0.63 to 100 ppm	2-54			
13L	0.1 to 8.1 ppm	2-55			
Carbon monoxide	7-15	CO	1HH	1 to 50 %	2-56
			1H	0.1 to 10 %	2-57
			1M	0.05 to 4 %	2-58
			1LM	25 to 2000 ppm	2-59
			1L	2.5 to 2000 ppm	2-60
			1La	8 to 1000 ppm	2-61
			1LK	5 to 600 ppm	2-62
			1LKC	5 to 100 ppm	2-63
			1LL	5 to 50 ppm	2-64
			1LC	1 to 30 ppm	2-65
			1D (Dosi)	1.04 to 2000 ppm	4-10
			1DL (Dosi)	0.4 to 400 ppm	4-11
			1A (Air)	5 to 50 ppm	3-14
			Carbon tetrachloride	7-16	CCl <sub>4</sub>
134L	0.25 to 12 ppm	2-67			
Carbonyl sulphide	—	COS	21	5 to 200 ppm	2-68
Chlorine	7-16	Cl <sub>2</sub>	21LA	2 to 125 ppm	2-69
			8HH	0.25 to 10 %	2-70
			8H	25 to 1000 ppm	2-71
			80	0.7 to 14 ppm	2-16
			8La	0.1 to 16 ppm	2-72
			8LL	0.025 to 2 ppm	2-73
			8D (Dosi)	0.08 to 100 ppm	4-12
Chlorine ion	—	Cl <sup>-</sup>	132D (Dosi)	2.4 to 240 ppm	4-27
			8TP (Auto)	0.05 to 0.6 ppm	3-41
			221L	25 to 1000 mg/l	5-19
Chlorine dioxide	7-17	ClO <sub>2</sub>	221LL	10 to 200 mg/l	5-20
			23M	0.1 to 10 ppm	2-74
			23L	0.025 to 1.2 ppm	2-75
			8H	25 to 250 ppm	2-71
Chlorobenzene	7-17	C <sub>6</sub> H <sub>5</sub> Cl	8La	0.3 to 4.8 ppm	2-72
			126	2 to 500 ppm	2-76
Chlorobromomethane	—	CH <sub>2</sub> BrCl	126L	0.5 to 43 ppm	2-77
			135	22 to 110 ppm	2-212
			136H	18 to 270 ppm	2-155
			136L	11 to 110 ppm	2-156
			136La	0.7 to 12.6 ppm	2-157
Chlorocyclohexane	—	C <sub>6</sub> H <sub>11</sub> Cl	102L	50 to 1200 ppm	2-110
Chlorodifluoromethane (R22)	—	CHClF <sub>2</sub>	51H (Pyro)	1000 to 24000 ppm	3-4

Substance to be measured			Detector tube to be used		
Substance name	Page	Chemical formula	Tube number	Measuring range	Page
Chlorodifluoromethane (R22) (contd.)			51 (Pyro)	25 to 1000 ppm	3-5
			51L (Pyro)	2.5 to 135 ppm	3-6
Chloroform	7-18	CHCl <sub>3</sub>	137	4 to 400 ppm	2-78
			137LA	0.5 to 30 ppm	2-79
			137LL	0.3 to 4.5 ppm	2-80
Chloropicrin	7-18	Cl <sub>3</sub> CNO <sub>2</sub>	134	2.5 to 60 ppm	2-66
2-Chloro-1,1,1,2-tetrafluoroethane (R124)	—		51	45 to 1800 ppm	3-5
Copper ion	—	Cu <sup>2+</sup>	284	1 to 20 mg/l	5-25
m-Cresol	—	C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> )OH	61	1 to 25 ppm	2-81
o-Cresol	7-19	C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> )OH	61	0.4 to 62.5 ppm	2-81
p-Cresol	—	C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> )OH	61	1 to 25 ppm	2-81
Chromium (VI) ion	—	Cr <sup>6+</sup>	273	0.5 to 50 mg/l	5-23
Cumene	—	C <sub>6</sub> H <sub>5</sub> CH(CH <sub>3</sub> ) <sub>2</sub>	122L	2 to 100 ppm	2-211
			122DL (Dosi)	3.4 to 850 ppm	4-26
Cyclohexane	7-19	C <sub>6</sub> H <sub>12</sub>	102H	0.015 to 1.2 %	2-109
			102L	60 to 1440 ppm	2-110
Cyclohexanol	7-20	C <sub>6</sub> H <sub>11</sub> OH	118	5 to 100 ppm	2-82
Cyclohexanone	7-20	C <sub>6</sub> H <sub>10</sub> O	154	2 to 75 ppm	2-83
			91L	10 to 470 ppm	2-105
Cyclohexene	7-21	C <sub>6</sub> H <sub>10</sub>	151	0.05 to 0.8 %	2-13
Cyclohexylamine	—	C <sub>6</sub> H <sub>13</sub> N	180	7 to 140 ppm	2-21
			180L	0.5 to 10 ppm	2-22
Cymene	—	C <sub>10</sub> H <sub>14</sub>	141L	5.6 to 224 ppm	2-92
Decane	—	C <sub>10</sub> H <sub>22</sub>	105	200 to 6000 ppm	2-112
Diacetone alcohol	—	(CH <sub>3</sub> ) <sub>2</sub> C(OH)CH <sub>2</sub> COCH <sub>3</sub>	154	2.5 to 100 ppm	2-83
Diacetyl	—	CH <sub>3</sub> COCOCH <sub>3</sub>	92	25 to 1500 ppm	2-8
Diborane	—	B <sub>2</sub> H <sub>6</sub>	22	0.02 to 5 ppm	2-84
1, 1-Dibromoethane	—	CH <sub>3</sub> CHBr <sub>2</sub>	136L	7 to 70 ppm	2-156
1, 2-Dibromoethane	—	BrCH <sub>2</sub> CH <sub>2</sub> Br	136H	14 to 210 ppm	2-155
			136L	8 to 80 ppm	2-156
Dibromomethane	—	CH <sub>2</sub> Br <sub>2</sub>	136L	5 to 50 ppm	2-156
Di-n-butylamine	—	(CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> ) <sub>2</sub> NH	180	5 to 100 ppm	2-21
			180L	0.4 to 8 ppm	2-22
m-Dichlorobenzene	—	C <sub>6</sub> H <sub>4</sub> Cl <sub>2</sub>	127	2.5 to 300 ppm	2-85
o-Dichlorobenzene	—	C <sub>6</sub> H <sub>4</sub> Cl <sub>2</sub>	127	2.5 to 300 ppm	2-85
p-Dichlorobenzene	—	C <sub>6</sub> H <sub>4</sub> Cl <sub>2</sub>	127	2.5 to 300 ppm	2-85
			127P (Auto)	100 to 3000 μg/m <sup>3</sup>	3-42
Dichlorodifluoromethane (R12)	—	CCl <sub>2</sub> F <sub>2</sub>	51H (Pyro)	325 to 7800 ppm	3-4
			51 (Pyro)	11 to 440 ppm	3-5
			51L (Pyro)	1.8 to 97 ppm	3-6
1, 1-Dichloroethane	7-21	CH <sub>3</sub> CHCl <sub>2</sub>	135	90 to 450 ppm	2-212
1, 2-Dichloroethane	7-22	ClCH <sub>2</sub> CH <sub>2</sub> Cl	135	400 to 2000 ppm	2-212
			135L	104 to 1040 ppm	2-213
1, 2-Dichloroethylene	7-22	ClCH:CHCl	139	5 to 250 ppm	2-86
			132HA	80 to 800 ppm	2-215
			132LL	0.375 to 6 ppm	2-218
			132D (Dosi)	6 to 600 ppm	4-27
			174D (Dosi)	3.9 to 600 ppm	4-8
1, 1-Dichloro-1-fluoroethane (R141b)	—	CH <sub>3</sub> CCl <sub>2</sub> F	51 (Pyro)	10 to 1000 ppm	3-5
			51L (Pyro)	1.1 to 22 ppm	3-6
Dichloropentafluoropropane (R225)	—	C <sub>3</sub> HCl <sub>2</sub> F <sub>5</sub>	51 (Pyro)	20 to 800 ppm	3-5

Substance to be measured			Detector tube to be used		
Substance name	Page	Chemical formula	Tube number	Measuring range	Page
Dichloropentafluoropropane (R225) (contd.)			51L (Pyro)	1.4 to 28 ppm	3-6
1, 3-Dichloropropene	—	ClCH <sub>2</sub> CH: CHCl	132HA	45 to 450 ppm	2-215
			131La	0.5 to 10 ppm	2-221
1,2-Dichloro-1,1,2,2-tetrafluoroethane (R114)	—	CClF <sub>2</sub> CClF <sub>2</sub>	51H (Pyro)	475 to 11400 ppm	3-4
			51 (Pyro)	20 to 800 ppm	3-5
			51L (Pyro)	1.8 to 97 ppm	3-6
2,2-Dichloro-1,1,1-trifluoroethane (R123)	—	CHCl <sub>2</sub> CF <sub>3</sub>	51 (Pyro)	14 to 1600 ppm	3-5
			51L (Pyro)	1.4 to 28 ppm	3-6
Diethylamine	7-23	(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> NH	180	5.5 to 110 ppm	2-21
			180L	0.45 to 9 ppm	2-22
Diethylaminoethanol	—	(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> NCH <sub>2</sub> CH <sub>2</sub> OH	180L	0.6 to 12 ppm	2-22
Diethyl benzene	—	C <sub>6</sub> H <sub>4</sub> (C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub>	122L	2 to 150 ppm	2-211
Diethylenetriamine	—	H <sub>2</sub> NCH <sub>2</sub> CH <sub>2</sub> NHCH <sub>2</sub> CH <sub>2</sub> NH <sub>2</sub>	180L	0.95 to 19 ppm	2-22
Diethylethanolamine	—	(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> NC <sub>2</sub> H <sub>4</sub> OH	180	6 to 120 ppm	2-21
Diisobutylene	—	(CH <sub>3</sub> ) <sub>3</sub> CCH: C(CH <sub>3</sub> ) <sub>2</sub>	121	45 to 540 ppm	2-33
Diisobutyl ketone	—	[(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> ] <sub>2</sub> CO	102L	0.2 to 1.0 %	2-110
			91L	0.58 to 29 ppm	2-105
Diisopropylamine	—	[(CH <sub>3</sub> ) <sub>2</sub> CH] <sub>2</sub> NH	180	5 to 100 ppm	2-21
			180L	0.3 to 6 ppm	2-22
Diisopropyl benzene	—	C <sub>6</sub> H <sub>5</sub> N[CH(CH <sub>3</sub> ) <sub>2</sub> ] <sub>2</sub>	141L	10 to 400 ppm	2-92
N, N-Dimethylacetamide	—	CH <sub>3</sub> CON(CH <sub>3</sub> ) <sub>2</sub>	184	1.5 to 240 ppm	2-87
Dimethylamine	—	(CH <sub>3</sub> ) <sub>2</sub> NH	3H	1.2 to 19.2 %	2-23
			180	5.5 to 110 ppm	2-21
			180L	0.45 to 9 ppm	2-22
			3D (Dosi)	1.9 to 750 ppm	4-6
2-Dimethylaminoethanol	—	(CH <sub>3</sub> ) <sub>2</sub> NCH <sub>2</sub> CH <sub>2</sub> OH	180L	0.65 to 13 ppm	2-22
Dimethylaminopropylamine	—	(CH <sub>3</sub> ) <sub>2</sub> NCH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> NH <sub>2</sub>	180	8 to 160 ppm	2-21
			180L	0.6 to 12 ppm	2-22
N, N-Dimethylaniline	7-23	C <sub>6</sub> H <sub>3</sub> (CH <sub>3</sub> ) <sub>2</sub> (NH <sub>2</sub> )	181	2.5 to 30 ppm	2-29
Dimethyl disulphide	—	CH <sub>3</sub> S <sub>2</sub> CH <sub>3</sub>	53 (Pyro)	0.3 to 6 ppm	3-8
Dimethylethanolamine	—	(CH <sub>3</sub> ) <sub>2</sub> NCH <sub>2</sub> CH <sub>2</sub> OH	180	6.5 to 130 ppm	2-21
			180L	0.65 to 13 ppm	2-22
N, N-Dimethylethylamine	—	C <sub>2</sub> H <sub>5</sub> N(CH <sub>3</sub> ) <sub>2</sub>	180	4 to 80 ppm	2-21
			180L	0.3 to 6 ppm	2-22
			3D (Dosi)	4 to 1600 ppm	4-6
N, N-Dimethylformamide	7-24	HCON (CH <sub>3</sub> ) <sub>2</sub>	183	0.8 to 90 ppm	2-88
Dimethylhydrazine	—	NH <sub>2</sub> N(CH <sub>3</sub> ) <sub>2</sub>	185	0.1 to 2 ppm	2-111
Dimethyl sulphide	—	CH <sub>3</sub> SCH <sub>3</sub>	53 (Pyro)	0.25 to 10 ppm	3-8
			77	1 to 15 mg/m <sup>3</sup>	2-47
1, 4-Dioxane	7-24	C <sub>4</sub> H <sub>8</sub> O <sub>2</sub>	163	0.1 to 6 %	2-96
			159	25 to 140 ppm	2-206
Dipropylamine	—	(CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> ) <sub>2</sub> NH	180	4 to 80 ppm	2-21
			180L	0.35 to 7 ppm	2-22
Divinyl benzene	—	C <sub>6</sub> H <sub>4</sub> (CH: CH <sub>2</sub> ) <sub>2</sub>	124L	1 to 15 ppm	2-194
Divinyl methoxysilane	—	(CH <sub>2</sub> : CH <sub>2</sub> ) <sub>2</sub> CH <sub>3</sub> OSi	113L	2.5 to 40 ppm	2-145
Enfurane	—	CHF <sub>2</sub> CClFOCHF <sub>2</sub>	51 (Pyro)	20 to 1200 ppm	3-5
			51L (Pyro)	25 to 145 ppm	3-6
Epichlorohydrin	7-25	CH <sub>2</sub> OCHCH <sub>2</sub> Cl	163L	1.2 to 120 ppm	2-97
Ethanol	7-25	C <sub>2</sub> H <sub>5</sub> OH	112	0.01 to 7.5 %	2-89
			112L	50 to 2000 ppm	2-90
			112D (Dosi)	100 to 25000 ppm	4-13

Substance to be measured			Detector tube to be used		
Substance name	Page	Chemical formula	Tube number	Measuring range	Page
Ethanolamine	—	$H_2NCH_2CH_2OH$	180	7 to 140 ppm	2-21
			180L	1.95 to 39 ppm	2-22
Ethyl acetate	7-26	$CH_3CO_2C_2H_5$	141	0.1 to 1.5 %	2-91
			141L	20 to 800 ppm	2-92
Ethyl acrylate	7-26	$CH_2: CHCO_2C_2H_5$	141 L	8 to 320 ppm	2-92
Ethylamine	—	$C_2H_5NH_2$	180	5 to 100 ppm	2-21
			180L	0.45 to 9 ppm	2-22
Ethyl benzene	7-27	$C_6H_5C_2H_5$	122	11 to 330 ppm	2-210
			122L	1 to 70 ppm	2-211
			122DL (Dosi)	2.8 to 700 ppm	4-26
			122P (Auto)	110 to 2750 $\mu g/m^3$	3-58
p-Ethyl benzylchloride	—	$C_6H_4(C_2H_5)CH_2Cl$	131La	2.5 to 50 ppm	2-221
Ethyl bromide	7-27	$C_2H_5Br$	136L	2.5 to 200 ppm	2-156
Ethyl chloroformate	—	$ClCO_2C_2H_5$	131La	7 to 140 ppm	2-221
Ethyl chloride	7-28	$C_2H_5Cl$	138	15 to 150 ppm	2-161
Ethylene	7-28	$CH_2: CH_2$	103	0.35 to 16.8 %	2-113
			171	0.1 to 2 %	2-15
			172	25 to 1680 ppm	2-93
			172L	0.2 to 100 ppm	2-94
			174D (Dosi)	1.5 to 240 ppm	4-8
Ethylene chlorohydrin	—	$ClCH_2CH_2OH$	111L	20 to 200 ppm	2-153
Ethylenediamine	7-29	$H_2NCH_2CH_2NH_2$	180	14 to 280 ppm	2-21
			180L	0.9 to 18 ppm	2-22
Ethylene glycol	7-29	$HOCH_2CH_2OH$	165L	10 to 100 $mg/m^3$	2-95
Ethylene glycol monobutyl ether	7-30	$CH_3(CH_2)_3OCH_2CH_2OH$	113L	30 to 1000 ppm	2-145
			113LL	23 to 230 ppm	2-146
Ethylene glycol monoethyl ether	7-30	$C_2H_5OCH_2CH_2OH$	113L	62.5 to 1000 ppm	2-145
			113LL	15.2 to 152 ppm	2-146
Ethylene glycol monoethyl ether acetate	—	$CH_3CO_2CH_2CH_2OC_2H_5$	113L	6 to 96 ppm	2-145
Ethylene glycol monomethyl ether	7-31	$CH_3OCH_2CH_2OH$	113L	15 to 900 ppm	2-145
			113LL	20 to 200 ppm	2-146
Ethylene glycol monomethyl ether acetate	7-31	$CH_3CO_2CH_2CH_2OCH_3$	113L	20 to 1300 ppm	2-145
Ethylene oxide	7-32	$C_2H_4O$	163	0.05 to 3.0 %	2-96
			163L	0.4 to 350 ppm	2-97
			163LL	0.1 to 10 ppm	2-98
			163TPM (Auto)	1 to 50 ppm	3-43
			163TP (Auto)	0.1 to 5 ppm	3-44
			161	0.04 to 1.0 %	2-99
Ethyl ether	7-32	$(C_2H_5)_2O$	161L	10 to 1200 ppm	2-100
			72	0.5 to 120 ppm	2-101
Ethyl mercaptan	7-33	$C_2H_5SH$	72L	0.2 to 75 ppm	2-102
			70	0.5 to 120 ppm	2-148
			70L	0.1 to 8 ppm	2-149
			71H	100 to 3800 ppm	2-169
			180	5 to 100 ppm	2-21
N-Ethylmorpholine	—	$C_6H_{13}NO$	180L	0.3 to 6 ppm	2-22
			222	0.1 to 10 $mg/l$	5-21
Free residual chlorine	—	$ClO^-$	17	0.5 to 50 ppm	2-122
Fluorine	—	$F_2$	51H (Pyro)	—	3-4
Fluorochlorocarbons	—	—	51 (Pyro)	—	3-5
			51L (Pyro)	—	3-6

Substance to be measured			Detector tube to be used		
Substance name	Page	Chemical formula	Tube number	Measuring range	Page
Formaldehyde	7-33	HCHO	91M	8 to 6400 ppm	2-103
			91	2 to 100 ppm	2-104
			91L	0.1 to 40 ppm	2-105
			91LL	0.05 to 1 ppm	2-106
			91D (Dosi)	0.1 to 20 ppm	4-14
			91P (Auto)	0.02 to 1.44 ppm	3-45
			91PL (Auto)	0.01 to 0.80 ppm	3-46
			91TP (Auto)	0.01 to 1.75 ppm	3-47
Formic acid	7-34	HCO <sub>2</sub> H	81	5.2 to 130 ppm	2-11
			81L	0.5 to 20 ppm	2-12
			81D	0.55 to 110 ppm	4-4
Furfural	7-34	C <sub>5</sub> H <sub>4</sub> O <sub>2</sub>	154	2 to 30 ppm	2-83
☐ Gasoline	7-35	C <sub>n</sub> H <sub>m</sub>	91D (Dosi)	0.3 to 60 ppm	4-14
			101	0.015 to 1.2 %	2-107
☐ Halothane	—	CF <sub>3</sub> CHBrCl	101L	30 to 2000 ppm	2-108
			1M	0.1 to 2 %	2-58
			51H (Pyro)	800 to 6400 ppm	3-4
Heptane	—	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>5</sub> CH <sub>3</sub>	51 (Pyro)	240 to 960 ppm	3-5
			51L (Pyro)	3 to 60 ppm	3-6
			101	0.015 to 1.2 %	2-107
Hexamethylenediamine	—	H <sub>2</sub> N(CH <sub>2</sub> ) <sub>6</sub> NH <sub>2</sub>	101L	30 to 2000 ppm	2-108
			103	0.035 to 1.68 %	2-113
Hexane	7-35	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>4</sub> CH <sub>3</sub>	105	90 to 2700 ppm	2-112
			180L	1.55 to 31 ppm	2-22
			102H	0.015 to 1.2 %	2-109
			102L	4 to 1200 ppm	2-110
			102TP (Auto)	2 to 80 ppm	3-48
2-Hexyl alcohol	—	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> CH(OH)CH <sub>3</sub>	103	0.025 to 1.2 %	2-113
Hexylamine	—	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>5</sub> NH <sub>2</sub>	105	80 to 2400 ppm	2-112
			141L	60 to 2400 ppm	2-92
Hydrazine	7-36	N <sub>2</sub> H <sub>4</sub>	180	9 to 180 ppm	2-21
			180L	0.65 to 13 ppm	2-22
			185	0.05 to 2 ppm	2-111
Hydrocarbons (Higher Class)	—	C <sub>6</sub> to C <sub>10</sub>	3D (Dosi)	1.6 to 650 ppm	4-6
			105	100 to 3000 ppm	2-112
Hydrocarbons (Lower Class)	—	C <sub>2</sub> to C <sub>7</sub>	103	0.05 to 2.4 %	2-113
Hydrogen	7-36	H <sub>2</sub>	30	0.5 to 2 %	2-114
Hydrogen bromide	7-37	HBr	15L	0.8 to 16 ppm	2-172
Hydrogen chloride	7-37	HCl	14R (for Low Humidity)	50 to 5000 ppm	2-115
			14M	10 to 1000 ppm	2-116
			14L	0.2 to 76 ppm	2-117
			14D (Dosi)	1 to 100 ppm	4-15
			8HH	1.5 to 30 %	2-70
			80	8 to 160 ppm	2-16
			132D (Dosi)	1.8 to 180 ppm	4-27
			12H	0.05 to 1.6 %	2-118
Hydrogen cyanide	7-38	HCN	12M	17 to 2400 ppm	2-119
			12L	0.36 to 120 ppm	2-120
			12LL	0.2 to 7 ppm	2-121
			12D (Dosi)	1 to 200 ppm	4-16
			12TP	0.3 to 9.0 ppm	3-49

Substance to be measured			Detector tube to be used		
Substance name	Page	Chemical formula	Tube number	Measuring range	Page
Hydrogen fluoride	7-38	HF	17	0.25 to 100 ppm	2-122
			17L	0.09 to 72 ppm	2-123
			17LL	0.05 to 24 ppm	2-124
			17D (Dosi)	1 to 100 ppm	4-17
			17TP (Auto)	0.05 to 9.0 ppm	3-50
			14D (Dosi)	2.5 to 250 ppm	4-15
Hydrogen peroxide	—	H <sub>2</sub> O <sub>2</sub>	32	0.5 to 10 ppm	2-125
			32D (Dosi)	0.5 to 40 ppm	4-18
Hydrogen sulphide	7-39	H <sub>2</sub> S	4HT	1 to 40 %	2-126
			4HP	0.25 to 20 %	2-127
			4HH	0.1 to 4 %	2-128
			4H	10 to 4000 ppm	2-129
			4HM	25 to 1600 ppm	2-130
			4M	12.5 to 500 ppm	2-131
			4L	1 to 240 ppm	2-132
			4LL	0.25 to 120 ppm	2-133
			4LK	1 to 40 ppm	2-134
			4LB	0.5 to 12 ppm	2-135
			4LT	0.1 to 4 ppm	2-136
			45S	1.25 to 120 ppm	2-137
			4S (Odour)	10 to 200 ppb	3-67
			4D (Dosi)	0.2 to 200 ppm	4-19
			4TP	0.5 to 16.0 ppm	3-51
			Hydrogen sulphide + Sulphur dioxide	—	H <sub>2</sub> S + SO <sub>2</sub>
Iodine	7-39	I <sub>2</sub>	9L	0.2 to 12 ppm	2-173
			80	0.12 to 2.4 ppm	2-16
Iron ion	—	Fe <sup>2+</sup>	281	5 to 50 mg/l	5-22
Isoamyl acetate	7-40	CH <sub>3</sub> CO <sub>2</sub> (CH <sub>2</sub> ) <sub>2</sub> CH(CH <sub>3</sub> ) <sub>2</sub>	148	10 to 200 ppm	2-139
Isoamyl alcohol	7-40	(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> CH <sub>2</sub> OH	117	5 to 300 ppm	2-140
Isobutane	—	(CH <sub>3</sub> ) <sub>3</sub> CH	103	0.035 to 1.68 %	2-113
			104	55 to 3080 ppm	2-40
Isobutene	—	(CH <sub>3</sub> ) <sub>2</sub> C: CH <sub>2</sub>	101L	0.07 to 2.2 %	2-108
Isobutyl acetate	7-41	CH <sub>3</sub> CO <sub>2</sub> CH <sub>2</sub> CH(CH <sub>3</sub> ) <sub>2</sub>	144	10 to 300 ppm	2-141
Isobutyl acrylate	—	CH <sub>2</sub> : CHCO <sub>2</sub> CH <sub>2</sub> CH(CH <sub>3</sub> ) <sub>2</sub>	142L	2.6 to 78 ppm	2-44
Isobutyl alcohol	7-41	(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> OH	116	10 to 150 ppm	2-142
Isooctane	—	(CH <sub>3</sub> ) <sub>3</sub> CCH <sub>2</sub> CH(CH <sub>3</sub> ) <sub>2</sub>	101	0.027 to 0.54 %	2-107
Isopentane	—	(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> CH <sub>3</sub>	103	0.045 to 2.16 %	2-113
Isophorone	7-42	C <sub>9</sub> H <sub>14</sub> O	154	2 to 30 ppm	2-83
Isoprene	—	CH <sub>2</sub> : C(CH <sub>3</sub> )CH: CH <sub>2</sub>	174D	2.6 to 400 ppm	4-8
Isopropyl acetate	7-42	CH <sub>3</sub> CO <sub>2</sub> CH(CH <sub>3</sub> ) <sub>2</sub>	146	10 to 500 ppm	2-143
Isopropyl alcohol	7-43	CH <sub>3</sub> CH(OH)CH <sub>3</sub>	113	0.02 to 5 %	2-144
			113L	25 to 800 ppm	2-145
			113LL	20 to 440 ppm	2-146
			113TP (Auto)	20 to 400 ppm	3-52
Isopropylamine	7-43	(CH <sub>3</sub> ) <sub>2</sub> CHNH <sub>2</sub>	180	5.5 to 110 ppm	2-21
			180L	0.45 to 9 ppm	2-22
Isopropyl ether	—	[(CH <sub>3</sub> ) <sub>2</sub> (CH)] <sub>2</sub> O	161	0.018 to 0.45 %	2-99
			141 L	18 to 720 ppm	2-92
Isopropyl mercaptan	—	(CH <sub>3</sub> ) <sub>2</sub> CHSH	70	10 to 240 ppm	2-148
Isovaleric acid	—	(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> CO <sub>2</sub> H	81	2 to 50 ppm	2-11
			81L	0.38 to 15 ppm	2-12

Substance to be measured			Detector tube to be used		
Substance name	Page	Chemical formula	Tube number	Measuring range	Page
L LP-gas (LPG)	7-44	C <sub>3</sub> ·C <sub>4</sub>	100A	0.02 to 0.8 %	2-147
M Maleic anhydride	—	C <sub>4</sub> H <sub>2</sub> O <sub>3</sub>	81	0.8 to 20 ppm	2-11
Mercaptans	—	R·SH	70	0.5 to 120 ppm	2-148
2-Mercaptoethanol	—	HSCH <sub>2</sub> CH <sub>2</sub> OH	70L	0.1 to 8 ppm	2-149
Mercury vapour	7-44	Hg	75L	0.5 to 7.5 ppm	2-46
Mercury	7-44	Hg	40	0.05 to 13.2 mg/m <sup>3</sup>	2-150
Mesityl oxide	—	(CH <sub>3</sub> ) <sub>2</sub> C: CHCOCH <sub>3</sub>	271	1 to 20 mg/l	5-22
Methacrylic acid	—	CH <sub>2</sub> : C(CH <sub>3</sub> ) COOH	141 L	27 to 1080 ppm	2-92
			81	1.8 to 45 ppm	2-11
			81L	0.35 to 14 ppm	2-12
Methacrylonitrile	—	CH <sub>2</sub> : C(CH <sub>3</sub> )CN	192	0.2 to 32 ppm	2-151
Methaldehyde	—	(CH <sub>3</sub> CHO) <sub>n</sub>	91L	0.065 to 3.25 ppm	2-105
Methanol	7-45	CH <sub>3</sub> OH	111	0.002 to 4.5 %	2-152
			111L	20 to 1000 ppm	2-153
			111LL	2 to 56 ppm	2-154
			111TP (Auto)	20 to 300 ppm	3-53
1-Methoxy-2-propanol	—	CH <sub>3</sub> OCH <sub>2</sub> CH(OH)CH <sub>3</sub>	113L	50 to 800 ppm	2-145
			113LL	15.2 to 152 ppm	2-146
Methyl acrylate	7-45	CH <sub>2</sub> : CHCO <sub>2</sub> CH <sub>3</sub>	141L	8 to 320 ppm	2-92
2-Methyl allyl chloride	—	CH <sub>3</sub> CH <sub>2</sub> : CHCH <sub>2</sub> Cl	131La	2.8 to 55 ppm	2-221
Methylamine	7-46	CH <sub>3</sub> NH <sub>2</sub>	180	5 to 100 ppm	2-21
			180L	0.5 to 10 ppm	2-22
			3DL (Dosi)	0.19 to 19 ppm	4-7
N-Methylaniline	7-46	C <sub>6</sub> H <sub>5</sub> NHCH <sub>3</sub>	181	3.5 to 42 ppm	2-29
Methyl bromide	7-47	CH <sub>3</sub> Br	136H	10 to 600 ppm	2-155
			136L	2.5 to 200 ppm	2-156
			136LA	1 to 36 ppm	2-157
			136LL	0.1 to 3.0 ppm	2-158
2-Methyl-3-butenenitrile	—	(CH <sub>3</sub> ) <sub>2</sub> CHCH: CHCN	191L	0.4 to 12 ppm	2-19
Methyl chloride	—	CH <sub>3</sub> Cl	51 (Pyro)	12 to 480 ppm	3-5
			51L (Pyro)	1.6 to 86 ppm	3-6
Methyl chloroformate	—	ClCO <sub>2</sub> CH <sub>3</sub>	131La	58 to 1160 ppm	2-221
Methylcyclohexane	—	C <sub>6</sub> H <sub>11</sub> CH <sub>3</sub>	102H	0.04 to 0.84 %	2-109
Methylcyclohexanol	7-47	CH <sub>3</sub> C <sub>6</sub> H <sub>10</sub> OH	119	5 to 100 ppm	2-159
Methylcyclohexanone	7-48	C <sub>7</sub> H <sub>12</sub> O	155	2 to 100 ppm	2-160
Methylene chloride	7-48	CH <sub>2</sub> Cl <sub>2</sub>	138	20 to 500 ppm	2-161
			138L	4 to 150 ppm	2-162
			51L (Pyro)	1 to 54 ppm	3-6
Methylene iodide	—	CH <sub>2</sub> I <sub>2</sub>	121L	0.22 to 22 ppm	2-35
Methyl ether	—	CH <sub>3</sub> OCH <sub>3</sub>	161	0.03 to 0.85 %	2-99
Methyl ethyl ketone	7-49	CH <sub>3</sub> COC <sub>2</sub> H <sub>5</sub>	152	0.02 to 0.6 %	2-163
			152L	10 to 384 ppm	2-164
			152TP (Auto)	20 to 300 ppm	3-54
			152D (Dosi)	2 to 600 ppm	4-20
			151L	21 to 1680 ppm	2-14
			91D (Dosi)	0.125 to 25 ppm	4-14
			151D (Dosi)	6.5 to 1950 ppm	4-5
Methylhydrazine	—	H <sub>2</sub> NNHCH <sub>3</sub>	185	0.6 to 12 ppm	2-111
Methyl iodide	7-49	CH <sub>3</sub> I	230H	100 to 34800 ppm	2-165
			230	0.5 to 108 ppm	2-166
			121L	0.32 to 32 ppm	2-35

Substance to be measured			Detector tube to be used		
Substance name	Page	Chemical formula	Tube number	Measuring range	Page
Methyl isobutyl ketone	7-50	(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> COCH <sub>3</sub>	153	0.05 to 0.6 %	2-167
			153L	2.5 to 130 ppm	2-168
			151D (Dosi)	11.5 to 3450 ppm	4-5
			152D (Dosi)	4 to 1200 ppm	4-20
Methyl mercaptan	7-50	CH <sub>3</sub> SH	71H	20 to 2700 ppm	2-169
			71	0.25 to 140 ppm	2-170
			70	0.35 to 84 ppm	2-148
			70L	0.1 to 8 ppm	2-149
Methyl methacrylate	—	CH <sub>2</sub> : C(CH <sub>3</sub> )CO <sub>2</sub> CH <sub>3</sub>	149	10 to 500 ppm	2-171
N-Methylmorpholine	—	CH <sub>3</sub> N(C <sub>2</sub> H <sub>4</sub> ) <sub>2</sub> O	180	5 to 100 ppm	2-21
			180L	0.3 to 6 ppm	2-22
4-Methyl pyridine	—	C <sub>6</sub> H <sub>7</sub> N	182	0.38 to 10.5 ppm	2-191
N-Methyl pyrrolidone	—	C <sub>5</sub> H <sub>9</sub> NO	180	50 to 270 ppm	2-21
Morpholine	—	NH(C <sub>2</sub> H <sub>4</sub> )O	180	9 to 180 ppm	2-21
			180L	0.5 to 10 ppm	2-22
<input type="checkbox"/> Naphthalene	—	C <sub>10</sub> H <sub>8</sub>	60	0.5 to 14 ppm	2-183
Nickel	—	Ni	291	5 to 50 mg/l	5-27
Nitric acid	7-51	HNO <sub>3</sub>	80	5 to 100 ppm	2-16
			15L	0.1 to 40 ppm	2-172
			14D (Dosi)	0.8 to 80 ppm	4-15
			17D (Dosi)	0.32 to 32 ppm	4-17
Nitro compounds	—	—	52 (Pyro)	0.5 to 30 ppm	3-7
Nitroethane	—	CH <sub>3</sub> CH <sub>2</sub> NO <sub>2</sub>	52 (Pyro)	4 to 240 ppm	3-7
Nitrogen dioxide	7-51	NO <sub>2</sub>	10	2.5 to 200 ppm	2-177
			9L	0.5 to 125 ppm	2-173
			80	0.2 to 4 ppm	2-16
			52 (Pyro)	0.5 to 30 ppm	3-7
			9D (Dosi)	0.1 to 30 ppm	4-21
			9DL (Dosi)	0.01 to 3 ppm	4-22
			9P (Auto)	0.02 to 0.2 ppm	3-55
			10	2.5 to 200 ppm	2-177
Nitrogen oxide	—	NO	10	2.5 to 200 ppm	2-177
Nitrogen oxides	—	NO + NO <sub>2</sub>	11HA	50 to 2500 ppm	2-174
			11S	5 to 625 ppm	2-175
			11L	0.04 to 16.5 ppm	2-176
			11A (Air)	0.02 to 2 ppm	3-15
Nitromethane	—	CH <sub>3</sub> NO <sub>2</sub>	52 (Pyro)	5 to 300 ppm	3-7
1-Nitropropane	—	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> NO <sub>2</sub>	52 (Pyro)	4.2 to 252 ppm	3-7
2-Nitropropane	—	(CH <sub>3</sub> ) <sub>2</sub> CHNO <sub>2</sub>	52 (Pyro)	3.7 to 222 ppm	3-7
Nonane	—	C <sub>9</sub> H <sub>20</sub>	105	130 to 3900 ppm	2-112
<input type="checkbox"/> Octane	—	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>6</sub> CH <sub>3</sub>	101	0.036 to 0.72 %	2-107
Oil mist	—		105	100 to 3000 ppm	2-112
			109AD (Air)	0.2 to 5 mg/m <sup>3</sup>	3-16
			109A (Air)	0.3 to 1.5 mg/m <sup>3</sup>	3-17
Olefines	—	—	100A	0.34 to 13.6 %	2-147
Oxygen	7-52	O <sub>2</sub>	31B	3 to 24 %	2-178
Ozone	7-52	O <sub>3</sub>	18M	4 to 400 ppm	2-179
			18L	0.025 to 3 ppm	2-180
			218	1 to 10 mg/l	5-18
			133L	40 to 500 ppm	2-204
<input type="checkbox"/> Pentachloroethane	—	Cl <sub>2</sub> CHCCl <sub>3</sub>	133L	40 to 500 ppm	2-204
1, 3-Pentadiene	—	CH <sub>3</sub> CH: CHCH: CH <sub>2</sub>	174	250 to 4000 ppm	2-37
			174L	42.5 to 850 ppm	2-38

Substance to be measured			Detector tube to be used		
Substance name	Page	Chemical formula	Tube number	Measuring range	Page
Pentamethylenediamine	—	H <sub>2</sub> N(CH <sub>2</sub> ) <sub>5</sub> NH <sub>2</sub>	180L	0.75 to 15 ppm	2-22
Pentane	—	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> CH <sub>3</sub>	103	0.0375 to 1.8 %	2-113
			104	30 to 1680 ppm	2-40
2-Pentenenitrile	—	CH <sub>3</sub> CH <sub>2</sub> CH: CHCN	193	0.5 to 15 ppm	2-181
			191L	0.24 to 7.2 ppm	2-19
3-Pentenenitrile	—	CH <sub>3</sub> CH: CHCH <sub>2</sub> CN	191L	0.4 to 12 ppm	2-19
Petroleum benzine	7-53	—	106	0.5 to 28 mg/l	2-182
Petroleum ether	7-53	—	106	0.5 to 28 mg/l	2-182
Petroleum naphtha	7-54	—	106	0.5 to 28 mg/l	2-182
Phenol	7-54	C <sub>6</sub> H <sub>5</sub> OH	60	0.4 to 187 ppm	2-183
Phosgene	7-55	COCl <sub>2</sub>	16	0.05 to 20 ppm	2-184
Phosphine	7-55	PH <sub>3</sub>	7H	200 to 5500 ppm	2-185
			7J	2.5 to 1000 ppm	2-186
			7	2.5 to 100 ppm	2-187
			7LA	0.05 to 9.8 ppm	2-189
			7L	0.15 to 5 ppm	2-188
			α-Pinene	—	C <sub>10</sub> H <sub>16</sub>
Propane	7-56	CH <sub>3</sub> CH <sub>2</sub> CH <sub>3</sub>	103	0.05 to 2.4 %	2-113
			100B (Inject)	0.1 to 2 %	3-37
Propionaldehyde	—	CH <sub>3</sub> CH <sub>2</sub> CHO	151L	24 to 1880 ppm	2-14
			91L	0.76 to 38 ppm	2-105
Propionic acid	—	CH <sub>3</sub> CH <sub>2</sub> COOH	81	3 to 75 ppm	2-11
			81 L	0.25 to 10 ppm	2-12
Propionitrile	—	CH <sub>3</sub> CH <sub>2</sub> CN	191	50 to 1200 ppm	2-18
Propyl acetate	7-56	CH <sub>3</sub> CO <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>	145	20 to 500 ppm	2-190
Propyl alcohol	—	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>2</sub> OH	113	0.04 to 2.5 %	2-144
			113L	65 to 1040 ppm	2-145
			113LL	13.6 to 136 ppm	2-146
			180	6 to 120 ppm	2-21
Propylamine	—	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>2</sub> NH <sub>2</sub>	180L	0.5 to 10 ppm	2-22
			100A	0.02 to 0.8 %	2-147
Propylene	—	CH <sub>3</sub> CH: CH <sub>2</sub>	131La	40 to 800 ppm	2-221
Propylene dichloride	—	CH <sub>3</sub> CHClCH <sub>2</sub> Cl	180	5.5 to 110 ppm	2-21
Propyleneimine	7-57	CH <sub>3</sub> CHCH <sub>2</sub> NH	180L	0.35 to 7 ppm	2-22
			163	0.065 to 3.9 %	2-96
Propylene oxide	7-57	CH <sub>3</sub> CHCH <sub>2</sub> O	163L	1 to 100 ppm	2-97
			70	22.5 to 540 ppm	2-148
Propyl mercaptan	—	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>2</sub> SH	70L	0.12 to 9.6 ppm	2-149
			182	0.2 to 35 ppm	2-191
Pyridine	7-58	C <sub>5</sub> H <sub>5</sub> N	128	50 to 8000 mg/m <sup>3</sup>	2-192
Stoddard solvent	7-58	—	153	0.075 to 0.9 %	2-167
Styrene	7-59	C <sub>6</sub> H <sub>5</sub> CH: CH <sub>2</sub>	124	10 to 1500 ppm	2-193
			124L	2 to 100 ppm	2-194
			124S (Odour)	0.2 to 4 ppm	3-68
			122DL (Dosi)	26 to 6500 ppm	4-26
			211H (S-ion)	10 to 1000 ppm	5-14
			211M (S-ion)	2 to 300 ppm	5-15
			211 (S-ion)	1 to 100 ppm	5-16
Sulphide ion	—	S <sup>2-</sup>	211LL (S-ion)	0.5 to 20 ppm	5-17
			201H (T-sulph)	0.02 to 0.2 mg	5-7
			201L (T-sulph)	0.002 to 0.02 mg	5-8

Substance to be measured			Detector tube to be used					
Substance name	Page	Chemical formula	Tube number	Measuring range	Page			
Sulphur dioxide	7-59	SO <sub>2</sub>	5H	0.05 to 8 %	2-195			
			5M	20 to 3600 ppm	2-196			
			5L	1.25 to 200 ppm	2-197			
			5La	0.5 to 60 ppm	2-198			
			5LC	0.1 to 25 ppm	2-199			
			5Lb	0.05 to 10 ppm	2-200			
			45S	0.25 to 20 ppm	2-137			
			80	1.5 to 30 ppm	2-16			
			5DH (Dosi)	10 to 600 ppm	4-23			
			5D (Dosi)	0.2 to 100 ppm	4-24			
			Sulphuric acid	—	H <sub>2</sub> SO <sub>4</sub>	35	0.5 to 5 mg/m <sup>3</sup>	2-201
			T 1, 1, 2, 2-Tetrabromoethane 1,1,2,2-Tetrachloro-1,2-difluoroethane (R112)	—	Br <sub>2</sub> CHCHBr <sub>2</sub>	135L	0.92 to 9.2 ppm	2-213
				—	CCl <sub>2</sub> FCCl <sub>2</sub> F	51H (Pyro)	125 to 3000 ppm	3-4
		51 (Pyro)		7 to 280 ppm	3-5			
			51L (Pyro)	1 to 54 ppm	3-6			
1, 1, 2, 2-Tetrachloroethane	7-60	Cl <sub>2</sub> CHCHCl <sub>2</sub>	131L	2 to 30 ppm	2-222			
Tetrachloroethylene	7-60	Cl <sub>2</sub> C: CCl <sub>2</sub>	132HH	0.075 to 1.5 %	2-214			
			133HA	7 to 900 ppm	2-202			
			133M	2 to 250 ppm	2-203			
			133L	1 to 75 ppm	2-204			
			133LL	0.1 to 9 ppm	2-205			
			133LC	0.05 to 0.3 mg/l	5-12			
			133P	20 to 720 µg/m <sup>3</sup>	3-56			
			133TP	5 to 80 ppm	3-57			
			133D (Dosi)	3 to 150 ppm	4-25			
			132D (Dosi)	1.5 to 150 ppm	4-27			
			Tetrahydrofuran	7-61	C <sub>4</sub> H <sub>8</sub> O	161	0.056 to 1.4 %	2-96
						159	20 to 800 ppm	2-206
			Tetrahydrothiophene	—	C <sub>4</sub> H <sub>8</sub> S	76H	10 to 200 ppm	2-207
76M	10 to 100 mg/m <sup>3</sup>	2-208						
76	1 to 10 ppm	2-209						
Tetramethylenediamine	—	H <sub>2</sub> N(CH <sub>2</sub> ) <sub>4</sub> NH <sub>2</sub>	180	8.5 to 170 ppm	2-21			
			180L	0.8 to 16 ppm	2-22			
Thionyl chloride	—	SOCl <sub>2</sub>	5La	1.44 to 21.6 ppm	2-198			
Toluene	7-61	C <sub>6</sub> H <sub>5</sub> CH <sub>3</sub>	161	0.02 to 0.8 %	2-99			
			122	5 to 690 ppm	2-210			
			122L	1 to 100 ppm	2-211			
			122P	100 to 7000 µg/m <sup>3</sup>	3-58			
			122TP	2 to 80 ppm	3-59			
			122DL (Dosi)	2 to 500 ppm	4-26			
			o-Toluidine	7-62	C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> )(NH <sub>2</sub> )	181	5 to 60 ppm	2-29
			Trichloroacetic acid	—	CCl <sub>3</sub> COOH	15L	1 to 37.5 ppm	2-172
1, 2, 4-Trichlorobenzene	—	C <sub>6</sub> H <sub>3</sub> Cl <sub>3</sub>	131La	0.65 to 13 ppm	2-221			
1, 1, 1-Trichloroethane	7-62	CH <sub>3</sub> CCl <sub>3</sub>	171	0.06 to 1.2 %	2-15			
			135	100 to 2000 ppm	2-212			
			135L	6 to 900 ppm	2-213			
			135	220 to 750 ppm	2-212			
1, 1, 2-Trichloroethane	—	Cl <sub>2</sub> CHCH <sub>2</sub> Cl	135	220 to 750 ppm	2-212			
Trichloroethylene	7-63	Cl <sub>2</sub> C: CHCl	132HH	0.05 to 2.5 %	2-214			
			132HA	20 to 1300 ppm	2-215			
			132M	2 to 250 ppm	2-216			
			132L	1 to 70 ppm	2-217			
			132LL	0.125 to 8.8 ppm	2-218			
			132LC	0.1 to 0.4 mg/l	5-11			

Substance to be measured			Detector tube to be used					
Substance name	Page	Chemical formula	Tube number	Measuring range	Page			
Trichloroethylene (contd.)			132P	20 to 1200 $\mu\text{g}/\text{m}^3$	3-60			
			132TP	1 to 33 ppm	3-61			
			132D (Dosi)	3 to 300 ppm	4-27			
Trichlorofluoromethane (R11)	—	$\text{CCl}_3\text{F}$	51H (Pyro)	275 to 6600 ppm	3-4			
			51 (Pyro)	8 to 320 ppm	3-5			
			51L (Pyro)	0.8 to 43 ppm	3-6			
			1, 2, 3-Trichloropropane	—	$\text{CH}_2\text{ClCHClCH}_2\text{Cl}$	135L	36 to 360 ppm	2-213
			1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	—	$\text{CClF}_2\text{CCl}_2\text{F}$	51H (Pyro)	250 to 6000 ppm	3-4
			51 (Pyro)	10 to 400 ppm	3-5			
			51L (Pyro)	1 to 54 ppm	3-6			
1,1,1-Trichloro-2,2,2-trifluoroethane (R113a)	—	$\text{CCl}_3\text{CF}_3$	51H (Pyro)	200 to 4800 ppm	3-4			
			51 (Pyro)	10 to 400 ppm	3-5			
			51L (Pyro)	0.8 to 43 ppm	3-6			
Triethylamine	7-63	$(\text{C}_2\text{H}_5)_3\text{N}$	180	4.5 to 90 ppm	2-21			
			180L	0.3 to 6 ppm	2-22			
			3D (Dosi)	5.3 to 2100 ppm	4-6			
Trimethylamine	—	$(\text{CH}_3)_3\text{N}$	3M	25 to 250 ppm	2-25			
			180	3.5 to 70 ppm	2-21			
			180L	0.25 to 5 ppm	2-22			
			3DL (Dosi)	0.23 to 23 ppm	4-7			
			Trimethylbenzene	—	$\text{C}_6\text{H}_3(\text{CH}_3)_3$	123	10 to 300 ppm	2-229
<input type="checkbox"/> Unknown gases	—	—	107 (Poly)	—	3-25			
			25 (Poly)	—	3-26			
			26 (Poly)	—	3-27			
			27 (Poly)	—	3-28			
<input type="checkbox"/> Valeric acid	—	$\text{CH}_3(\text{CH}_2)_3\text{COOH}$	81L	0.38 to 15 ppm	2-12			
Vinyl acetate	—	$\text{CH}_3\text{CO}_2\text{CH}:\text{CH}_2$	141	0.06 to 0.9 %	2-91			
			143	5 to 250 ppm	2-219			
Vinyl chloride	7-64	$\text{CH}_2:\text{CHCl}$	131	0.025 to 2 %	2-220			
			131LB	0.25 to 70 ppm	2-223			
			131La	0.25 to 54 ppm	2-221			
			131L	0.1 to 6.6 ppm	2-222			
			131P	50 to 1500 $\mu\text{g}/\text{m}^3$	3-62			
			174D (Dosi)	1.56 to 240 ppm	4-8			
Vinylidene chloride	—	$\text{CH}_2:\text{CCl}_2$	130L	0.4 to 40.6 ppm	2-224			
Vinyl trimethoxysilane	—	$\text{CH}_2:\text{CHSi}(\text{OCH}_3)_3$	113L	2.5 to 40 ppm	2-145			
<input type="checkbox"/> Water vapour	—	$\text{H}_2\text{O}$	6	0.5 to 32 mg/l	2-225			
			6L	0.05 to 2 mg/l	2-226			
			6LP	3 to 100 $\text{lb}/\text{MMCF}$	2-227			
			6LLP	2 to 10 $\text{lb}/\text{MMCF}$	2-228			
			6AH (Air)	500 to 5000 ppm	3-18			
			6A (Air)	30 to 80 mg/ $\text{m}^3$	3-19			
			6Ag (Air)	150 to 3000 mg/ $\text{m}^3$	3-20			
<input type="checkbox"/> Xylene	7-64	$\text{C}_6\text{H}_4(\text{CH}_3)_2$	100A	0.1 to 1.2 %	2-147			
			123	5 to 625 ppm	2-229			
			123L	2 to 200 ppm	2-230			
			123TP (Auto)	2 to 80 ppm	3-63			
			122L	2 to 200 ppm	2-211			
			122DL (Dosi)	3.4 to 850 ppm	4-26			
			122P (Auto)	540 to 13500 $\mu\text{g}/\text{m}^3$	3-58			
<input type="checkbox"/> Zinc	—	Zn	285	3 to 20 mg/l	5-26			