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ANNEX III

Quality Criteria for Environmental and Occupational Pollutants

A3.1 INTRODUCTION

As noted in section 3, agreed environmental quality criteria may be used to assess environmental health factors identified and predicted during EHIA.

Quality criteria may lay down maximum limits for specific pollutants, below which the pollutant should not pose a danger to human health. Guidelines have also been produced by a number of organisations which indicate potential sources, likely impacts of and control methods for particular pollutants without setting limit values.

Quality criteria and guidelines for both environmental and industrial pollutants have been produced by a wide range of organisations, at both national and international level. In this annex we include examples for the main types of pollutants identified as impacting on health.

A3.2 - Air pollutant criteria
A3.3 - Water pollutant criteria
A3.4 - Noise criteria

A3.2 EXAMPLES OF AIR POLLUTANT CRITERIA

A3.2.

Characteristics, Sources and Control of Major Air Pollutants
After World Bank

Pollutant	Characteristics	Principal sources	Controls
Total suspended particulates (TSP)	Any solid or liquid particles dispersed in the atmosphere, such as dust, pollen, ash, soot, metals, and various chemicals; the particles are often classified according to size as settleable particles; larger than 50 microns aerosols: smaller than 50 microns; and fine particulates: smaller than 3 microns	Natural events such as forest fires, wind erosion, volcanic eruptions; stationary combustion, especially of solid fuels; construction activities; industrial processes; atmospheric reactions	Cleaning of flue gases with inertial separators, fabric filters, scrubbers, or electrostatic precipitators; alternative means for solid waste reduction; improved control procedures for construction and industrial processes
Sulphur dioxide (SO_2)	A colourless gas with a pungent odour; SO_2 can oxidize to form sulphur trioxide (SO_3), which forms sulphuric acid with water	Combustion of fossil fuels; refining of petroleum; smelting of ores containing sulphur, manufacture of H_2SO_4; burning of S-containing refuse; papermaking; natural events such as volcanic eruptions.	Use of low-sulphur fuels; removal of sulphur from fuels before use; scrubbing of flue gases with lime or catalytic conversion
Carbon monoxide (CO)	A colourless, odourless gas with a strong chemical affinity for haemoglobin in blood	Incomplete combustion of fuels and other carbon-containing substances, such as in motor vehicle exhausts; natural events such as forest fires or decomposition of organic matter	Automobile engine modifications (proper tuning, exhaust gas recirculation, redesign of combustion chamber), control of automobile exhaust gases (catalytic or thermal devices); improved design, operation, and maintenance of stationary furnaces (use of finely dispersed fuels, proper mixing with air, high combustion temperature)
Photochemical oxidants (Ox)	Colourless, gaseous compounds which can comprise photochemical smog, e.g. ozone (O_3) peroxyacetyl nitrate (PAN), aldenydes, and other compounds	Photochemical reaction of hydrocarbon and nitrogen oxides from fuel combustion, refuse burning, and evaporation from petroleum products and organic solvents.	Reduced emissions of nitrogen oxides, hydrocarbons and possibly sulphur oxides.
Nitrogen dioxide (NO_2)	A brownish-red gas with a pungent odour, often formed from oxidation of nitric oxide (NO)	Motor vehicle exhausts; high-temperature stationary combustion; atmospheric reactions	Catalytic control of automobile exhaust gases; modification of automobile engines to reduce combustion temperature; scrubbing flue gases with caustic substances or urea
Hydrocarbons (HC)	Organic compounds in gaseous or particulate form, e.g. methane, ethylene, and acetylene	Incomplete combustion of fuels and other carbon-containing substances, such as in motor vehicle exhausts, processing, distribution, and use of petroleum compounds, such as gasoline and organic solvents, natural events such as forest fires and plant metabolism atmospheric reactions	Automobile engine modifications (proper tuning, crankcase ventilation, exhaust gas recirculation, redesign of combustion chamber); control of automobile exhaust gases catalytic or thermal devices; improved design, operation, and maintenance of stationary furnaces (use of finely dispersed fuels, proper mixing with air, high combustion temperature) improved control procedures in processing and handling petroleum compounds

A3.2 cont'd

Expected Health Effects of Air Pollution on Selected Population Groups (World Health Organisation, 1972)

Pollutant	Excess mortality and hospital admissions	Worsening of patients with pulmonary disease	Respiratory symptoms	Visibility and/ or human annoyance effects
SO_2[a]	500 $\mu g/m^3$ (daily average)	500-250 $\mu g/m^3$[b] (daily average)	100 $\mu g/m^3$ (annual arithmetic mean)	80 $\mu g/m^3$ (annual geometric mean)
Smoke[a]	500 $\mu g/m^3$ (daily average)	250 $\mu g/m^3$ (daily average)	100 $\mu g/m^3$ (annual arithmetic mean)	80 $\mu g/m^3$ (annual geometric mean)[c]

[a] British Standard Practice (Ministry of Technology, 1966). Values for sulphur dioxides and suspended particulates apply only in conjunction with each other. They may have to be adjusted when translated into terms of results obtained by other procedures.

[b] These values represent the differences of opinion within the Committee

[c] Based on high-volume samplers.

National Ambient Air Quality Standards

Substance and country	Long-term standard* mg/m³	ppm	Averaging time (hours)	Short-term standard* mg/m³	ppm	Averaging time (minutes)	Notes*
Acetaldehyde							
Bulgaria, Yugoslavia	—	—	—	*0.01*	0.005	30	—
East Germany	*0.01*	0.005	24	*0.03*	0.015	30	
USSR	*0.01*	0.005	24	*0.01*	0.005	30	—
West Germany (VDI 2306)	*4.0*	*2.0*	½	*12.0*	*6.0*	30	3, 4
Acetic acid							
Bulgaria	—	—	—	*0.2*	0.08	30	—
East Germany, USSR	*0.06*	0.024	24	*0.2*	0.08	30	1, 2
West Germany (VDI 2306)	*5.0*	*2.0*	½	*15.0*	*6.0*	30	3, 4
Acetic anhydride							
Bulgaria	—	—	—	*0.1*	0.025	30	—
East Germany, USSR	*0.03*	0.0073	24	*0.1*	0.025	30	1, 2
Acetone							
Bulgaria, Hungary, USSR, Yugoslavia	*0.35*	0.15	24	*0.35*	0.15	30	2, 5
East Germany	*0.35*	0.15	24	*1.0*	0.42	30	1
Hungary	*12.0*	5.0	24	*180.0*	75.0	30	—
Israel	*7.2*	*3.0*	24	24.0	*10.0*	30	6
Romania	*2.0*	0.83	24	*5.0*	2.1	30	—
West Germany (VDI 2306)	*120.0*	*50.0*	½	*360.0*	*150.0*	30	3, 4
Acetophenone							
Bulgaria	*0.35*	0.07	24	*0.35*	0.07	30	—
East Germany	*0.003*	0.0006	24	*0.01*	0.002	30	1
USSR, Yugoslavia	*0.003*	0.0006	24	*0.003*	0.0006	30	2
Acrolein							
Bulgaria, Czechoslovakia, Hungary, Romania, Yugoslavia	*0.1*	0.04	24	*0.3*	0.12	30	—
East Germany	*0.01*	0.004	24	*0.02*	0.008	30	1
Israel	0.1	*0.04*	24	0.25	*0.1*	30	6
USSR	*0.03*	0.012	24	*0.03*	0.012	30	—
West Germany (VDI 2306)	*0.01*	*0.005*	½	*0.025*	*0.01*	30	3, 4
Ammonia							
Bulgaria, Hungary, USSR, Yugoslavia	*0.2*	0.28	24	*0.2*	0.28	30	5
Czechoslovakia, East Germany, Romania	*0.1*	0.14	24	*0.3*	0.43	30	1
Hungary	*0.5*	0.71	24	*1.6*	2.14	30	—
Amyl acetate							
Bulgaria, Hungary, USSR, Yugoslavia	*0.1*	0.019	24	*0.1*	0.019	30	5
East Germany	*0.1*	0.019	24	*0.3*	0.057	30	1
Hungary	*90.0*	5.7	24	*90.0*	17.1	30	—
Israel	5.25	*1.0*	24	15.75	3.0	30	6
West Germany (VDI 2306)	*30.0*	*6.0*	½	*90.0*	*15.0*	30	3, 4
Amyl alcohol							
West Germany (VDI 2306)	*20.0*	*5.0*	½	*60.0*	*15.0*	30	3, 4
Amylene							
Bulgaria, USSR, Yugoslavia	*1.5*	0.5	24	*1.5*	0.5	30	2
East Germany	*1.0*	0.33	24	*1.5*	0.5	30	1
Aniline							
Bulgaria, Czechoslovakia, East Germany, USSR, Yugoslavia	*0.05*	0.008	24	*0.05*	0.013	30	1
Romania	*0.02*	0.005	24	*0.05*	0.013	30	—
West Germany (VDI 2306)	*0.8*	*0.2*	½	*2.4*	*0.6*	30	3, 4
Arsine							
Bulgaria, Czechoslovakia, USSR	*0.003*	—	24	—	—	—	7
East Germany	*0.003*	—	24	—	—	—	—
Israel	*0.006*	—	24	—	—	—	6, 7

Substance and country	Long-term standard[a] mg/m³	ppm	Averaging time (hours)	Short-term standard mg/m³	ppm	Averaging time (minutes)	Note
Poland	*0.003*	—	24	*0.01*	—	20	
	0.002	—	24	*0.005*	—	20	10
Romania	*0.01*	—	24	*0.03*	—	30	—
Yugoslavia	*0.003*	—	24	—	—	—	8
Benzene							
Czechoslovakia, Romania	*0.8*	0.25	24	*2.4*	0.75	30	—
East Germany, Hungary, Yugoslavia	*0.8*	0.25	24	*1.5*	0.46	30	1, 3
Hungary, West Germany (VDI 2306)	*3.0*	0.94	24	*10.0*	3.12	30	3, 4
Israel	1.6	*0.6*	24	4.8	*1.5*	30	6
Poland	*0.3*	0.09	24	*1.0*	0.31	20	9
	0.1	0.03	24	*0.2*	0.06	20	10
Benzene (high alkyl)							
West Germany (VDI 2306)	*5.0*	—	½	*15.0*	—	30	3, 4
Benzine							
East Germany	*0.03*	0.007	24	*0.06*	0.012	30	1, 13
Hungary	*80.0*	20.0	24	*240.0*	60.0	30	—
Hungary, USSR	*1.5*	0.38	24	*5.0*	1.25	30	5, 12
Israel	3.3	*0.8*	24	*10.0*	*2.4*	30	6, 12
Poland	*0.75*	0.19	24	*2.5*	0.63	20	10, 12
Romania	*2.0*	0.48	24	*6.0*	1.45	30	—
West Germany (VDI 2306)	*80.0*	*20.0*	½	*240.0*	*60.0*	30	3, 4, 12
Yugoslavia	*1.5*	0.38	24	*5.0*	1.25	30	11
Benzine (from shale)							
Bulgaria, USSR	*0.05*	0.012	24	*0.06*	0.012	20	11
Benzine (low sulfur)							
Bulgaria	*1.5*	0.38	24	*5.0*	1.25	30	11
East Germany, Yugoslavia	*1.5*	0.38	24	*5.0*	1.25	30	1
Beryllium							
Israel, Yugoslavia	*0.00001*	—	24	—	—	—	6
Butane							
Bulgaria, USSR, Yugoslavia	—	—	—	*200.0*	85.0	30	—
East Germany	*60.0*	21.0	24	*200.0*	85.0	30	1
Butanol							
Bulgaria, Yugoslavia	—	—	—	*0.5*	0.1	30	—
East Germany	*0.1*	0.03	24	*0.5*	0.1	30	1
USSR	—	—	—	*0.1*	0.03	30	—
West Germany (VDI 2306)	*15.0*	5.0	½	*45.0*	15.0	30	3, 4
n-Butyl acetate							
Bulgaria, USSR, Yugoslavia	*0.1*	0.021	24	*0.1*	0.021	30	—
East Germany	*0.1*	0.021	24	*0.5*	0.063	30	1
Israel	4.7	*1.0*	24	14.0	*3.0*	30	6
West Germany (VDI 2306)	*25.0*	*5.0*	½	*75.0*	*15.0*	30	3, 4
Butylene							
Bulgaria, USSR, Yugoslavia	*3.0*	1.2	24	*3.0*	1.2	30	2
East Germany	*2.0*	0.8	24	*3.0*	1.2	30	1
Butyric acid							
Bulgaria, USSR, Yugoslavia	*0.01*	0.003	24	*0.015*	0.004	30	—
Cadmium							
Yugoslavia	*0.003*	—	24	*0.01*	—	30	—
Caproic acid							
USSR, Yugoslavia	*0.005*	0.001	24	*0.01*	0.002	30	—
Caprolactam							
Bulgaria, USSR, Yugoslavia	*0.06*	0.013	24	*0.06*	0.013	30	14
East Germany	*0.06*	0.013	24	*0.1*	0.022	30	1
Caprylic acid							
Bulgaria, East Germany	*0.003*	0.001	24	*0.01*	0.002	30	1

A3.2 cont'd

Substance and country	Long-term standard* mg/m³	ppm	Averaging time (hours)	Short-term standard* mg/m³	ppm	Averaging time (minutes)	Note*
Chlorotetracycline							
East Germany	0.05	—	24	0.05	—	30	1, 24
USSR	0.05	—	24	0.05	—	30	25
Chromium							
Romania	0.0015	—	24	0.0015	—	30	26
Chromium (hexavalent)							
East Germany	0.001	—	24	0.0015	—	30	1, 27
Israel	0.0015	—	24	—	—	—	6, 27
USSR	0.0015	—	24	0.0015	—	20	27
Yugoslavia	0.0015	—	24	0.0015	—	30	27
Cresol (all isomers)							
West Germany (VDI 2306)	0.2	0.05	½	0.6	0.15	30	3, 4
Cyclohexane							
East Germany	1.0	0.3	24	1.4	0.4	30	1
USSR	1.4	0.4	24	1.4	0.4	30	—
Cyclohexanol							
Bulgaria, USSR, Yugoslavia	0.06	0.015	24	0.06	0.015	30	—
East Germany	0.06	0.015	24	0.15	0.037	30	1
Cyclohexanone							
Bulgaria, Hungary, Yugoslavia	0.04	0.01	24	0.04	0.01	30	5
East Germany	0.04	0.01	24	0.1	0.02	30	1
Hungary	10.0	2.5	24	30.0	7.5	30	—
USSR	—	—	—	0.04	0.01	30	—
West Germany (VDI 2306)	10.0	2.0	½	30.0	6.0	30	3, 4
Cyclohexanon oxime							
East Germany	0.04	0.01	24	0.1	0.025	30	1
USSR	—	—	—	0.1	0.025	30	—
Dichloroethane							
Bulgaria, East Germany, Romania, USSR, Yugoslavia	1.0	0.25	24	3 0	0.75	30	1
Israel	2.0	0.5	24	6 0	1 5	30	6
West Germany (VDI 2306)	8.0	2.0	½	25.0	6.0	30	3, 4
2-3-Dichloro-1-4-naphthaquinone							
Bulgaria, East Germany	0.02	—	24	0.05	—	30	1
USSR, Yugoslavia	0.05	—	24	0.05	—	30	—
Diethylamine							
Bulgaria, Romania, USSR, Yugoslavia	0.05	0.016	24	0.05	0.016	30	—
East Germany	0.02	0.008	24	0.05	0.016	30	1
West Germany (VDI 2306)	0.03	0.01	½	0.05	0.02	30	3, 4
Diethyl ether							
West Germany (VDI 2306)	65.0	20.0	½	155.0	60.0	30	3, 4
Diketene							
Bulgaria, USSR, Yugoslavia	—	—	—	0 007	0.002	30	—
East Germany	0.002	0.001	24	0.007	0 002	30	1
Dimethylamine							
East Germany	0.005	0.003	24	0 015	0 0075	30	1
USSR	0 005	0.003	24	0 005	0.003	30	—
West Germany (VDI 2306)	0.02	0 01	½	0 06	0.03	30	3, 4
Dimethylaniline							
Bulgaria, Yugoslavia	—	—	—	0.0055	0.001	30	—
East Germany	0 005	0 001	24	0.015	0.003	30	1
USSR	0 0055	0 001	24	0.0055	0.001	30	—
Dimethyl Disulfide							
Bulgaria, USSR	—	—	—	0 7	0.18	30	—
East Germany	0 2	0 05	24	0.7	0.18	30	1
Yugoslavia	—	—	—	0 07	0.018	30	—

A3.2 cont'd

Substance and country	Long-term standard[a] mg/m³	ppm	Averaging time (hours)	Short-term standard[a] mg/m³	ppm	Averaging time (minutes)	Notes[b]
Carbon disulfide							
Bulgaria, Czechoslovakia, Romania, Yugoslavia	*0.01*	0 0033	24	*0.03*	0.01	30	—
East Germany	*0.005*	0 001	24	*0.03*	0.01	30	1
Israel	0.15	*0.05*	24	0 45	*0.15*	30	6
Poland	*0.016*	0.005	24	*0 045*	0 015	20	9
USSR	*0.005*	0.0016	24	*0.03*	0.01	30	2
Carbon monoxide							
Argentina	11.5	*10.0*	8	57.7	*50.0*	60	—
Bulgaria, East Germany, Hungary, USSR, Yugoslavia	*1.0*	0.9	24	*3.0*	2.7	30	1, 2, 5
Canada—Desirable level	*6.0*	*5.0*	8	*15.0*	*13 0*	60	15, 16
—Acceptable level	*15.0*	*13.0*	8	*35.0*	*30.0*	60	15, 17
Czechoslovakia	*1.0*	0.9	24	*6.0*	5.4	30	—
Finland	*10.0*	*9 0*	8	*40.0*	*35.0*	60	71
Hungary, Romania	*2.0*	1.8	24	*6.0*	5 4	30	—
Israel	11.5	*10.0*	8	35.0	*30.0*	30	—
Italy	23.0	*20.0*	8	57.7	*50.0*	30	18
Japan	11.5	*10.0*	24	—	—	—	19
	23.0	*20 0*	8	—	—	—	19
Poland	*0 6*	0 45	24	*3 0*	2.7	20	9
Spain	*15.0*	13.0	8	*45.0*	39.0	30	20
USA, West Germany	*10.0*	8.6	8	*40.0*	35.0	60	21
Carbon tetrachloride							
East Germany, USSR	*2.0*	0.33	24	*4.0*	0.66	30	1, 2.
Romania	*1.0*	0.16	24	*3.0*	0.5	30	—
West Germany (VDI 2306)	*3.0*	*0.5*	½	*10.0*	*1.5*	30	3, 4
Chlorine							
Bulgaria, Czechoslovakia, East Germany, Hungary, USSR, Yugoslavia	*0.03*	0 01	24	*0.1*	0.03	30	1, 3
Hungary	*0.3*	0.1	24	*0 6*	0.2	30	—
Israel	0.1	*0 05*	24	0.3	*0.1*	30	6
Italy	—	—	—	*0 68*	*0.2*	30	18
Poland	*0.03*	0.01	24	*0.1*	0.03	20	9
	0.01	0.003	24	*0.03*	0 01	20	10
Romania	*0.1*	0.033	24	*0.3*	0 1	30	—
Spain	*0.05*	0.016	24	*0.3*	0 1	30	20
West Germany	*0 3*	*0.1*	½	*0.6*	*0 2*	30	22
m-Chloroaniline							
East Germany	*0.01*	0.003	24	*0.03*	0.01	30	1
USSR	*0.01*	0.003	24	—	—	—	—
Yugoslavia	—	—	—	*0.04*	0.013	30	—
p-Chloroaniline							
Bulgaria	—	—	—	*0 04*	0 005	30	—
East Germany, USSR	*0.01*	0.002	24	*0 04*	0.005	30	1
Chlorobenzene							
Bulgaria, USSR, Yugoslavia	*0.1*	0.02	24	*0.1*	0.02	30	—
East Germany	*0.1*	0 02	24	*0.3*	0 06	30	1
West Germany (VDI 2306)	*5.0*	*1.0*	½	*15 0*	*3.0*	30	3, 9
Chloroform							
West Germany (VDI 2306)	*10 0*	*2.0*	½	*30 0*	*6.0*	30	3, 4, 23
m-Chlorophenyl isocyanate							
Bulgaria, USSR, Yugoslavia	*0 005*	—	24	*0.005*	—	30	2
East Germany	*0 005*	—	24	*0.005*	—	30	1
p-Chlorophenyl isocyanate							
Bulgaria, East Germany, USSR, Yugoslavia	*0 0015*	0 0002	24	*0 0015*	0 0002	30	1, 2
Chloroprene							
Bulgaria, USSR, Yugoslavia	*0 1*	0 028	24	*0.1*	0.028	30	—
East Germany	*0 05*	0 014	24	*0.1*	0 028	30	1
Israel	0 14	*0 04*	24	0 5	*0.14*	30	6

A3.2 cont'd

Substance and country	Long-term standard[a] mg/m³	ppm	Averaging time (hours)	Short-term standard[a] mg/m³	ppm	Averaging time (minutes)	Notes[b]
Dimethylformamide							
Bulgaria, USSR, Yugoslavia	*0.03*	0 01	21	*0.03*	0.01	30	—
East Germany	*0 01*	0 003	24	*0 05*	0 01	30	1
Israel	0.018	*0.006*	24	0.06	*0.02*	30	6
Dimethyl sulfide							
Bulgaria, USSR, Yugoslavia	—	—	—	*0 08*	0 03	30	—
East Germany	*0 03*	0.01	24	*0.03*	0.03	30	1
Dinitrobenzene							
West Germany (VDI 2306)	*0.035*	*0 005*	½	*0.1*	*0.015*	30	3, 4
Dinyl							
Bulgaria, Romania, USSR, Yugoslavia	*0.01*	0.0015	24	*0 01*	0 0015	30	2, 28
East Germany	*0.005*	0.0045	24	*0.01*	0.0015	30	1, 28
Dioxane							
West Germany	*20.0*	*5.0*	½	*60.0*	*15.0*	30	3, 4, 48
Divinyl							
Bulgaria, East Germany, USSR, Yugoslavia	*1.0*	0.4	24	*3.0*	1.2	30	1
Epichloronydrin							
Bulgaria, USSR, Yugoslavia	*0.2*	0.05	24	*0.2*	0.05	30	—
East Germany	*0.06*	0.016	24	*0.2*	0.05	30	1
Ethanol							
Bulgaria, USSR, Yugoslavia	*5.0*	2 5	24	*5.0*	2.5	30	2
East Germany	*5.0*	2.5	24	*15.0*	7.5	30	1
West Germany (VDI 2306)	*100.0*	*60.0*	½	*300.0*	*150.0*	30	3, 4
Ethyl acetate							
Bulgaria, USSR, Yugoslavia	*0.1*	0.029	24	*0.1*	0 029	30	—
East Germany	*0.1*	0.029	24	*0.3*	0 085	30	1
Israel	14.0	*4.0*	24	42 0	*12.0*	30	6
West Germany (VDI 2306)	*75.0*	*20.0*	½	*225.0*	*60.0*	30	3, 4
Ethylbenzene							
East Germany	*0 02*	0 005	24	*0.06*	0.014	30	1
USSR	*0.02*	0.005	24	*0.02*	0 005	30	—
Ethylene							
Bulgaria, USSR, Yugoslavia	*3.0*	2.3	24	*3.0*	2.3	30	2
East Germany	*3.0*	1.53	24	*3.0*	2.3	30	1
Israel	0.26	*0.2*	24	0.65	*0.5*	30	6
Ethylene oxide							
Bulgaria, East Germany, USSR, Yugoslavia	*0.03*	0.015	24	*0 3*	0.15	30	1
West Germany (VDI 2306)	*4.0*	*2.0*	½	*12.0*	*6.0*	30	3, 4
Ethylenimine							
East Germany	*0 001*	0 0005	24	*0.003*	0.0015	30	1
USSR	*0.001*	0 0005	24	*0.001*	0.0005	30	—
Fluorides (as F)							
Bulgaria, East Germany, Romania	*0 005*	0.002	24	*0.02*	0.01	30	1, 29
Czechoslovakia, Hungary, Israel	*0.01*	0.005	24	*0.03*	0.015	30	5, 6, 29
Hungary	*0 03*	0.015	24	*0.1*	0.05	30	—
Italy, Spain	*0.02*	0.01	24	*0.06*	0.03	30	18, 20
Fluorides							
Bulgaria, Poland	*0.01*	—	24	*0.03*	—	20	9, 31, 33, 35
East Germany, Yugoslavia	*0.01*	—	24	*0.03*	—	30	1, 31, 33, 35
Hungary	*0.02*	0 015	24	*0 02*	0 015	30	32
	0 0013	0 001	24	*0 005*	0.004	30	5, 32
Netherlands	*0 01*	0 008	24	—	—	—	—
Poland	*0.003*	—	24	*0.01*	—	20	10, 35
Spain, USSR	*0.01*	0 008	24	*0.05*	0.022	30	2, 20, 32, 33

A3.2 cont'd

Substance and country	Long-term standard* mg/m³	ppm	Averaging time (hours)	Short-term standard* mg/m³	ppm	Averaging time (minutes)	Notes*
USSR	*0 005*	0 002	24	*0.02*	0 01	20	2, 29, 30
West Germany	*0.002*	0.001	½	*0.005*	0.004	30	32
Yugoslavia	*0.005*	0.004	24	*0.02*	0.015	30	32
Fluorides (insoluble)							
Yugoslavia	*0.03*	—	24	*0.2*	—	30	—
Fluorides (sparingly soluble)							
East Germany, USSR	*0.03*	—	24	*0.2*	—	30	1, 34
Formaldehyde							
Bulgaria, East Germany, Hungary, USSR, Yugoslavia	*0.012*	0.01	24	*0.035*	0.025	30	1, 5
Czechoslovakia	*0.015*	0.01	24	*0 05*	0 033	30	—
Hungary	*0.03*	0.02	24	*0 07*	0 05	30	—
Israel, West Germany (VDI 2306)	*0.03*	*0.02*	24	*0.07*	*0.05*	30	3, 4, 6
Poland	*0.02*	0.014	24	*0.05*	0.033	20	9
	0.01	0.007	24	*0.02*	0.014	20	10
Romania	*0.01*	0.007	24	*0.03*	0.02	30	—
Furfural							
Bulgaria, USSR, Yugoslavia	*0.05*	0.013	24	*0 05*	0 013	30	2
East Germany, Romania	*0.05*	0.013	24	*0.15*	0.04	30	1
Israel	0 08	*0 02*	24	0.25	*0.06*	30	6
West Germany (VDI 2306)	*0 08*	*0.02*	½	*0.25*	0.06	30	3, 4
Hexachlorocyclonexane							
East Germany	*0.01*	—	24	*0.03*	—	30	1
USSR	*0.03*	—	24	*0.03*	—	30	—
Hexamethylenediamine							
Bulgaria, USSR	*0.001*	—	24	*0.001*	—	30	—
East Germany	*0.001*	—	24	*0 003*	—	30	1
Yugoslavia	*0.01*	—	24	*0.01*	—	30	—
Hydrocarbons (total)							
Israel	2 0	*3 0*	24	5.0	*7.5*	30	6
Italy	26.6	*40 0*	24	53.3	*80 0*	30	18, 36
United States	*0.16*	*0.24*	3	—	—	—	21, 37
Hydrochloric acid							
Bulgaria	*0.2*	0.14	24	—	—	—	39
Bulgaria, USSR, Yugoslavia	*0.006*	—	24	*0 006*	—	30	35
Czechoslovakia	—	—	—	*0.01*	0.007	30	39
	—	—	—	*0.01*	—	30	35
East Germany	*0.015*	*0.01*	24	*0.05*	0.035	30	1, 39
Hungary	*0.7*	*0.5*	24	*1.4*	1.0	30	2, 39
Hungary, USSR	*0.2*	0.14	24	*0.2*	0 14	30	2, 5, 39
Israel	0.4	*0.3*	24	1.4	*1.0*	30	6, 39
Italy	0.04	*0.03*	24	0.28	*0.2*	30	18, 39
Poland	*0.1*	0.07	24	*0.2*	0.14	20	9, 39
	0.02	0 014	24	*0.05*	0 035	20	10, 39
Romania	*0.1*	0 07	24	*0.3*	0.21	30	39
West Germany	*0 05*	0 035	½	*0.15*	0.1	30	39
Yugoslavia	—	—	—	*0.2*	0.14	30	39
Hydrogen cyanide							
East Germany	*0.005*	0.004	24	*0 015*	0.014	30	1
USSR	*0 01*	0 009	24	—	—	—	—
Hydrogen sulfide							
Bulgaria, Czechoslovakia, Hungary, USSR, Yugoslavia	*0.008*	0 005	24	*0 008*	0 005	30	2, 5
East Germany	*0 008*	0 005	24	*0 015*	0 01	30	1
Finland	*0 05*	0 03	24	*0.15*	0 1	30	71
Hungary	*0 15*	0 1	24	*0.3*	0.2	30	—
Israel	0.045	*0 03*	24	0.15	*0.1*	30	—
Italy	0 04	*0.03*	24	0 1	*0 07*	30	18

A3.2 cont'd

Substance and country	Long-term standard[a] mg/m³	ppm	Averaging time (hours)	Short-term standard[a] mg/m³	ppm	Averaging time (minutes)	Notes[b]
Poland	*0.02*	0.013	24	*0.06*	0 04	20	9
	0.008	0 003	24	*0 008*	0 003	20	10
Romania	*0 01*	0 006	24	*0.03*	0 02	30	—
Spain	*0.004*	0 0025	24	*0.01*	0.006	30	20
West Germany	*0.02*	0.013	½	*0.06*	0.03	30	—
Intrathion (M-81)							
USSR	*0.001*	—	24	*0.001*	—	30	—
Isooctanol							
East Germany	*0.05*	—	24	*0.15*	—	30	1
USSR	—	—	—	*0.15*	—	30	—
Isopropanol							
East Germany	*0.6*	0.24	24	*2.0*	0.82	30	1
Isopropyl benzene							
Bulgaria, USSR	*0.014*	—	24	*0.014*	—	30	2
East Germany	*0 014*	—	24	*0.06*	—	30	1
Isopropyl benzene (hydroperoxide)							
Bulgaria, USSR	*0.007*	—	24	*0.007*	—	30	2
East Germany	*0 007*	—	24	*0.02*	—	30	1
Lead							
Bulgaria, Czechoslovakia, East Germany, USSR, Yugoslavia	*0.0007*	—	24	—	—	—	2, 42
Hungary	*0 001*	—	24	*0.002*	—	30	—
	0.0007	—	24	*0.0007*	—	30	5
Israel	*0.005*	—	24	—	—	—	—
Italy	*0.01*	—	8	*0.05*	—	30	18
Poland	*0.001*	—	24	—	—	—	9
	0 0006	—	24	—	—	—	10
Romania	*0 001*	—	24	—	—	—	—
Lead sulfide (as Pb)							
Bulgaria	*0.0007*	—	24	—	—	—	—
East Germany, USSR, Yugoslavia	*0.0017*	—	24	—	—	—	—
Israel	*0.0035*	—	24	—	—	—	6
Malathion							
Bulgaria, USSR, Yugoslavia	—	—	—	*0.015*	—	30	43
Maleic Anhydride							
Bulgaria, East Germany, USSR, Yugoslavia	*0.05*	0.012	24	*0 2*	0.05	30	1, 2
Manganese							
Bulgaria, Czechoslovakia, East Germany, Yugoslavia	*0 01*	—	24	—	—	—	43
Israel, Romania	*0 01*	—	24	*0.03*	—	30	6
USSR	*0.01*	—	24	—	—	—	—
Mercury							
Bulgaria, East Germany, Hungary, USSR, Yugoslavia	*0.0003*	—	24	—	—	—	—
Israel, Romania	*0.001*	—	24	—	—	—	6
Mesidine							
Bulgaria, Yugoslav	—	—	—	*0.003*	—	30	44
USSR	*0.003*	—	24	*0.003*	—	30	44
Methanol							
Bulgaria, Czechoslovakia, East Germany, Hungary, USSR, Yugoslavia	*0.5*	0 38	24	*1.0*	0 77	30	1, 2, 5
Hungary	*15.0*	10 0	24	*40.0*	27 0	30	—
Israel	1 5	*1 0*	24	4.5	*3 0*	30	6
Romania	*1 0*	0.77	24	*3 0*	2.3	30	—
West Germany (VDI 2306)	*15 0*	*10 0*	½	*40 0*	*30 0*	30	3, 4
Methyl acetate							
Bulgaria, USSR, Yugoslavia	*0 07*	0 023	24	*0 07*	0 023	30	—
East Germany	*0.07*	0 023	24	*0.2*	0.066	30	1
Israel	3 0	*1 0*	24	9.0	*3 0*	30	6
West Germany (VDI 2306)	*15.0*	*5 0*	½	*45 0*	*15 0*	30	3, 4

A3.2 cont'd

Substance and country	Long-term standard[a] mg/m³	ppm	Averaging time (hours)	Short-term standard[a] mg/m³	ppm	Averaging time (minutes)	Notes[b]
Methyl acrylate							
Bulgaria Yugoslavia	—	—	—	*0.01*	0 003	30	—
East Germany	*0.01*	0.003	24	*0.05*	0.009	30	1
USSR	*0.01*	0.003	24	*0.01*	0.003	30	—
Methylaniline							
USSR	*0.04*	0.01	24	*0 04*	0.01	30	—
Yugoslavia	—	—	—	*0.04*	0.01	30	—
Methyl etnyl ketone							
West Germany (VDI 2306)	*90.0*	*10.0*	½	*90.0*	*30.0*	30	3, 4
Metnyl isooutyl ketone							
West Germany (VDI 2306)	*20.0*	*5 0*	½	*65.0*	*15.0*	30	3, 4
Methyl mercaptan							
Bulgaria, USSR, Yugoslavia	—	—	—	9×10^{-4}	—	30	—
East Germany	—	—	—	10^{-4}	—	30	1
Methyl methacrylate							
Bulgaria, USSR Yugoslavia	*0.1*	0.025	24	*0.1*	0.025	30	—
East Germany	*0.1*	0.025	24	*0.3*	0.075	30	1
Israel	*0 2*	0.05	24	*0 6*	0.15	30	6
Methylparathion							
Bulgaria, USSR, Yugoslavia	—	—	—	*0.008*	—	30	46
Methylene chloride							
West Germany (VDI 2306)	*20.0*	*5.0*	½	*55 0*	*15.0*	30	3, 4
α-Methylstyrene							
Bulgaria, USSR, Yugoslavia	*0.04*	0 01	24	*0.04*	0 01	30	—
East Germany	*0.03*	0.0075	24	*0.05*	0.0125	30	1
Monoethylamine							
East Germany	*0.01*	0.005	24	*0.03*	0 015	30	1
West Germany (VDI 2306)	*0 02*	0 01	½	*0.06*	0.03	30	3, 4
USSR	*0 01*	0.005	24	*0.01*	0 005	30	—
Monomethylaniline							
Bulgaria	—	—	—	*0 01*	0.009	30	—
East Germany	*0 03*	0.007	24	*0.05*	0 01	30	1
Naphthalene							
East Germany	*0 001*	0 0002	24	*0.003*	0.0006	30	1
USSR	*0.003*	0 0006	24	*0.003*	0.0006	30	—
West Germany (VDI 2306)	*8.5*	*0.5*	½	*7.5*	*1.5*	30	3, 4
α-Naphthaquinone							
Bulgaria, USSR, Yugoslavia	*0.005*	0.001	24	*0.005*	0.001	30	2
East Germany	*0.002*	0 0004	24	*0.005*	0.001	30	1
Nitric acid							
Bulgaria, USSR, Yugoslavia	*0.006*	0.0024	24	*0.006*	0.0024	30	2, 3
Bulgaria, Yugoslavia	—	—	—	*0.4*	0.16	30	47
Czechoslovakia	—	—	—	*0.01*	0.004	30	38
East Germany	*0 06*	0.024	24	*0.14*	0.056	30	1
Hungary	*1.3*	0.5	24	*2.6*	1.0	30	—
	0.4	0.16	24	*0 4*	0.16	30	5
Israel	0 42	*0.17*	24	1.3	*0.5*	30	6
USSR	*0.4*	0.16	24	*0.4*	0 16	30	47
West Germany (VDI 2106)	*1 3*	*0.5*	½	*2 6*	*1.0*	30	3, 40
Nitrobenzene							
Bulgaria	—	—	—	*0 04*	0 005	30	—
East Germany	*0 005*	0.001	24	*0 01*	0 002	30	1
Hungary	*0.9*	0 06	24	*0.86*	0 17	30	—
	0 005	0 0016	24	*0.03*	0 016	30	5
USSR, Yugoslavia	*0 005*	0 0016	24	*0 005*	0 0016	30	—
West Germany (VDI 2306)	*0 3*	*0 005*	½	*0.85*	*0.16*	30	3, 4

Substance and country	Long-term standard[a] mg/m³	ppm	Averaging time (hours)	Short-term standard[a] mg/m³	ppm	Averaging time (minutes)	Notes[a]
o-Nitrochlorobenzene							
East Germany	*0.004*	—	24	*0.008*	—	30	1
p-Nitrochlorobenzene							
East Germany	*0.004*	—	24	*0.008*	—	30	1
o- and p-Nitrochlorobenzene							
USSR	*0.004*	—	24	—	—	—	—
Nitrogen dioxide							
Argentina	—	—	—	0 85	*0.45*	60	—
Bulgaria, Hungary, USSR, Yugoslavia	*0.085*	0.045	24	*0 085*	0.045	30	2, 5
Canada—Desirable level	0.06	0.03	1 yr	—	—	—	15.16
Acceptable level	0.1	0.05	1 yr	0.4	0.21	60	15.17
Acceptable level	0.2	0.11	24	—	—	—	15 17
Czechoslovakia, Romania, West Germany	*0.1*	0.05	24	*0.3*	0.16	30	—
Finland	*0.2*	0.1	24	*0.56*	0.3	30	71
Hungary	*0.15*	0.08	24	*0.5*	0 27	30	—
Japan	0.04	*0.02*	24	—	—	—	19
Nitrogen monoxide							
West Germany	*0.4*	—	½	*0.8*	—	30	—
Nitrogen oxides							
Argentina	0.9	*0 45*	1	—	—	—	49
East Germany	*0 004*	0.002	24	*0 1*	0 06	30	1, 49
Hungary	*0.15*	0 075	24	*0 5*	0.25	30	49
	0.05	0 025	24	*0 15*	0 075	30	5, 49
Israel	0 6	*0 3*	24	1 0	*0.5*	30	49
Italy	0.2	*0 1*	24	0 6	*0.3*	30	18, 49
Poland	*0.2*	0.1	24	*0.6*	0.3	20	49
	0.05	0 025	24	*0 15*	0 075	20	10, 49
Spain	*0 2*	0 1	24	*0.4*	0.2	30	20, 49
United States	*0.1*	0 05	1 yr	—	—	—	21, 37, 49
West Germany (VDI 2105)	*1.0*	0.5	½	*2 0*	1.0	30	3, 41, 49
Nitrogen pentoxide							
Yugoslavia	*0.1*	—	24	*0.3*	—	30	—
Oxidants							
Argentina	—	—	—	0 2	*0.1*	60	51
Canada—Acceptable level	*0.05*	*0 025*	24	*0 16*	*0.08*	60	15, 17, 51
Acceptable level	*0.03*	*0 015*	1 yr	—	—	—	15, 17, 51
Desirable level	*0.05*	*0.015*	24	*0 1*	*0 05*	60	15, 16, 51
Israel	0.2	*0.1*	8	0.4	*0.2*	30	51
Japan	—	—	—	0.12	*0 06*	60	50
Romania	*0.05*	0.015	24	*0.1*	0.05	30	51
United States	—	—	—	*0.16*	*0 08*	60	21, 37, 51
Ozone							
Israel	0.1	*0.05*	24	0.2	0.1	30	6
Pentane							
Bulgaria, East Germany, USSR, Yugoslavia	*25.0*	8.5	24	*100 0*	33.9	30	1
Perchlorethylene							
West Germany (VDI 2306)	*35.0*	*5.0*	½	*110.0*	*15.0*	30	3, 4
Phenol							
Bulgaria, Hungary, Yugoslavia	*0.01*	0 0026	24	*0.01*	0.0026	30	5
Czechoslovakia	*0 1*	0 026	24	*0.3*	0.079	30	—
East Germany	*0 01*	0.0026	24	*0.03*	0.0079	30	1
Hungary	*0 2*	0 052	24	*0 6*	0.16	30	—
Israel	0.1	*0 025*	24	0.3	*0 075*	30	6
Poland	*0 01*	0 0026	24	*0 02*	0 0052	20	9
	0 008	0 0008	24	*0 01*	0 0026	20	10

Substance and country	Long-term standard[a] mg/m³	ppm	Averaging time (hours)	Short-term standard[a] mg/m³	ppm	Averaging time (minutes)	Notes[b]
Romania	*0 03*	0.0079	24	*0.1*	0.026	30	—
USSR	*0 01*	0 0026	24	*0.01*	0 0026	20	2
West Germany (VDI 2306)	*0.2*	*0.05*	½	*0 6*	*0.16*	30	3, 4
Phosphoric acid							
Romania	*0.1*	—	24	*0.3*	—	30	—
Phosphoric anhydride							
East Germany	*0.05*	0.0085	24	*0.15*	0.026	30	1
Israel	0.1	*0.017*	24	0.05	*0.0085*	30	6
Phosphorus pentoxide							
USSR, Yugoslavia	*0.05*	0.0085	24	*0.15*	0.026	30	—
Phthalic anhydride							
Bulgaria	*0.1*	0.015	24	*0.2*	0.03	30	—
East Germany	*0.03*	0.005	24	*0.1*	0.015	30	1
USSR	*0.1*	0.015	24	*0.1*	0.015	30	2, 14
Yugoslavia	*0.2*	0.03	24	*0.4*	0.06	30	—
Propane-2-ol							
USSR	*0.6*	—	24	*0.6*	—	30	—
Propanol							
Bulgaria	—	—	—	*0 3*	0.12	30	—
East Germany	*0.3*	0.12	24	*1.0*	0.36	30	1
USSR, Yugoslavia	*0 3*	0.12	24	*0.3*	0.12	30	—
West Germany (VDI 2306)	*50.0*	*20.0*	½	*150.0*	*60.0*	30	3, 4
Propyl-isobenzene hydroxide							
Yugoslavia	*0.007*	—	24	*0.007*	—	30	—
Propylene							
Bulgaria, USSR	*3.0*	1.5	24	*3.0*	1.5	30	2
East Germany	*2.0*	1.0	24	*3.0*	1.5	30	1
Pyridine							
Bulgaria, USSR, Yugoslavia	*0.08*	0.023	24	*0.08*	0 023	30	—
East Germany	*0.03*	0.009	24	*0.08*	0.023	30	1
Romania	*0 05*	0.014	24	*0.15*	0.04	30	—
West Germany (VDI 2306)	*0.7*	*0.2*	½	*2.1*	*0 6*	30	3, 4
Silica							
Italy	*0.02*	—	24	*0 1*	—	120	18
Soot							
Bulgaria, Czechoslovakia, East Germany, Romania, USSR	*0.05*	—	24	*0.15*	—	30	1
Hungary	*0.1*	—	24	—	—	—	—
	0.05	—	24	—	—	—	5
Israel	*0.1*	—	24	*0.3*	—	30	6
Styrene							
Bulgaria, Hungary, USSR, Yugoslavia	*0.003*	0 0007	24	*0.003*	0.0007	30	5
East Germany	*0.003*	0.0007	24	*0 01*	0 0023	30	1
Hungary	*20.0*	4.6	24	*50.0*	11.7	30	—
West Germany (VDI 2306)	*20.0*	*4.6*	½	*65.0*	*15 16*	30	3, 4
Sulfur dioxide							
Argentina	*0.07*	*0.03*	30 days	—	—	—	—
Belgium, Spain	*0 15*	*0.06*	1 yr	—	—	—	20, 76
Bulgaria, USSR	*0 05*	0.02	24	*0 5*	0.2	30	2
Canada—Acceptable level	*0.06*	*0.02*	1 yr	—	—	—	15, 17
Acceptable level	*0 3*	*0.11*	24	*0.9*	*0.34*	60	15, 17
Desirable level	*0 03*	*0 01*	1 yr	—	—	—	15, 16
Desirable level	*0 15*	*0.06*	24	*0 45*	*0.17*	60	15, 16
Columbia	*0 07*	0 03	1 yr	—	—	—	70
Czechoslovakia, East Germany, Hungary, West Germany, Yugoslavia	*0 15*	0 06	24	*0 5*	0.2	30	1, 5

A3.2 cont'd

Substance and country	Long-term standard* mg/m³	ppm	Averaging time (hours)	Short-term standard* mg/m³	ppm	Averaging time (minutes)	Notes*
Finland	*0.25*	0.1	24	*0.72*	0.28	30	71
	0.18	0.07	1 yr	—	—	—	71
France	*1.0*	0.38	24	—	—	—	—
Hungary	*0.5*	0.2	24	*1.0*	0.38	30	—
Israel	0.26	*0.1*	24	0.75	*0.3*	30	—
Italy	0 38	*0 15*	24	0 75	*0.3*	30	18
Japan	0.1	*0.04*	24	0.26	*0.1*	60	19
Netherlands	*0.075*	0.03	24	—	—	—	52, 53
	0.25	0.1	24	—	—	—	52, 54
	0.35	0.13	24	—	—	—	56, 57
	0.125	0 05	24	—	—	—	56, 58
	0.275	0 1	24	—	—	—	56, 59
Netherland, Turkey	*0.15*	0.06	24	—	—	—	55, 56, 63, 64
Poland	*0.35*	0.13	24	*0.9*	0.35	20	9
	0.075	0.03	24	*0.25*	0.1	20	10
Romania	*0.25*	0.1	24	*0.75*	0.3	20	—
Spain	*0.4*	0.15	24	*0.8*	0.3	30	20
	0.256	0.1	30 days	—	—	—	20
Sweden	*0 25*	*0.1*	24	*0.625*	*0.25*	30	60
	0.125	*0.05*	30 days	—	—	—	60
Switzerland	*0.75*	0.3	24	*1.25*	0.5	30	62
Switzerland, West Germany (VDI 2108)	*0.5*	0.2	24	*0.75*	0.3	30	3, 40, 61
Turkey	*0 30*	0.12	24	—	—	—	63, 65
United States	*0.08*	0.03	1 yr	—	—	—	66
	0.365	0.14	24	—	—	—	37, 66
	1.3	0.5	3	—	—	—	37, 67
West Germany	*0.4*	0.15	½	*0.75*	0.3	30	—
Sulfuric acid							
Bulgaria, Romania, USSR, Yugoslavia	*0.1*	—	24	*0.3*	—	30	2, 68
Bulgaria, Yugoslavia	*0.006*	—	24	*0.006*	—	30	38
Czechoslovakia	—	—	—	*0.01*	—	30	38
East Germany	*0.02*	—	24	*0.05*	—	30	1
Hungary, Israel	*0.1*	—	24	*0.3*	—	30	6
Poland	*0.1*	—	24	*0 3*	—	20	9
	0.05	—	24	*0.15*	—	20	10
USSR	*0 002*	—	24	*0.006*	—	30	2, 38
Suspended particulates							
Argentina	*0.15*	—	30 days	—	—	—	—
Bulgaria, Czechoslovakia, East Germany, Finland, Romania, USSR	*0.15*	—	24	*0.5*	—	30	1, 71, 73
Canada—Acceptable level	*0.07*	—	1 yr	—	—	—	15, 17, 69
Acceptable level	*0 12*	—	24	—	—	—	15, 17
Canada (Desirable level), United States, Colombia	*0.06*	—	1 yr	—	—	—	15, 16, 67, 69
Hungary	*0.1*	—	24	—	—	—	70
Hungary, Turkey, United States	*0.2*	—	24	—	—	—	15, 17
Israel	*0.15*	—	24	—	—	—	5, 63, 64, 67
Israel, United States	*0.2*	—	24	—	—	—	—
Italy	*0.075*	—	1 yr	—	—	—	66
Japan	*0.3*	—	24	*0 75*	—	120	18
Poland	*0.1*	—	24	*0.2*	—	60	19
	0.2	—	24	*0 6*	—	20	9, 72
Spain	*0.075*	—	24	*0.2*	—	20	10, 72
	0 13	—	1 yr	—	—	—	20
	0 202	—	30 days	—	—	—	20
	0.3	—	24	*0.6*	—	30	20

A3.2 cont'd

Substance and country	Long-term standard[a] mg/m³	ppm	Averaging time (hours)	Short-term standard[a] mg/m³	ppm	Averaging time (minutes)	Notes[b]	
Sweden	—	—	—	0.1	—	60	73	
United States	0.26	—	24	—	—	—	66	
West Germany	—	—	—	0.48	—	30	73	
	0.1	—	½	0.3	—	30		—
Tar								
Israel	1.0	—	24	3.0	—	30	6	
Tetrachloromethane								
Bulgaria	—	—	—	4.0	—	30		—
Tetrahydrofuran								
East Germany	0.2	0.07	24	0.6	0.21	30	1	
USSR	0.2	0.07	24	0.2	0.07	30		—
West Germany (VDI 2306)	30.0	10.0	½	90.0	30.0	30	3, 4	
Thiophene								
Bulgaria, USSR, Yugoslavia	—	—	—	0.6	0.17	30		—
East Germany	0.2	0.06	24	0.6	0.17	30	1	
Toluene								
Bulgaria, East Germany, Hungary, USSR, Yugoslavia	0.6	0.16	24	0.6	0.16	30	1, 3,	
Hungary	20.0	5.3	24	50.0	13.3	30		—
West Germany (VDI 2306)	20.0	5.0	½	60.0	15.0	30	3, 4	
Toluene diisocyanate								
Bulgaria, East Germany, Romania, USSR, Yugoslavia	0.02	0.0029	24	0.05	0.0071	30	1	
West Germany (VDI 2306)	0.009	0.001	½	0.021	0.003	30	3, 4	
Tributyl phosphate								
Bulgaria	—	—	—	0.01	—	30	1	—
USSR	0.01	—	24	0.01	—	30		—
Trichlorfon								
USSR	0.02	—	24	0.04	—	30	74	
Trichloroethane								
West Germany (VDI 2306)	30.0	5.0	½	90.0	15.0	30	3, 4	
Trichloroethylene								
Bulgaria, East Germany, USSR, Yugoslavia	1.0	0.18	24	4.0	0.74	30	1	
Hungary	30.0	5.6	24	50.0	9.3	30		—
	0.2	0.04	24	0.2	0.04	30	5	
West Germany (VDI 2306)	30.0	5.0	½	90.0	15.0	30	3, 4	
Triethylamine								
East Germany	0.05	0.012	24	0.14	0.035	30	1	
USSR	0.14	0.035	24	0.14	0.035	30		—
West Germany (VDI 2306)	0.04	0.01	½	0.12	0.03	30	3, 4	
2,4,6-Trimethylaniline								
East Germany	0.003	—	24	0.01	—	30	1, 75	
Turpentine								
West Germany (VDI 2306)	25.0	5.0	½	75.0	15.0	30	3, 4, 41	
n-Valeric acid								
Bulgaria, East Germany, USSR, Yugoslavia	0.01	0.003	24	0.03	0.008	30	1	
Vanadium pentoxide								
Bulgaria, East Germany, USSR	0.002	—	24	—	—	—		—
Czechoslovakia, Yugoslavia	0.003	—	24	—	—	—		—
Vinyl acetate								
Bulgaria, Czechoslovakia, Yugoslavia	0.2	0.006	24	0.2	0.006	30		—
East Germany	0.15	0.0045	24	0.4	0.012	30	1	
Israel	4.0	1.0	24	12.0	3.0	30	6	
USSR	0.15	0.0045	24	0.15	0.0045	30		—
West Germany (VDI 2306)	20.0	5.0	½	60.0	15.0	30	3, 4	
Xylene								
Bulgaria, Hungary, USSR, Yugoslavia	0.2	0.05	24	0.2	0.05	30	5	
East Germany	0.2	0.05	24	0.6	0.14	30	1	
Hungary	20.0	4.6	24	50.0	11.5	30		—
West Germany (VDI 2306)	20.0	5.0	½	60.0	15.0	30	3, 4	

SOURCE: UNEP, "Guidelines for Assessing Industrial Environmental Impact and Environmental Criteria for the Siting of Industry," 1982.

A3.3 EXAMPLES OF WATER POLLUTANT CRITERIA

Characteristics of surface water intended for the abstraction of drinking water*

(Commission of the European Communities, 1975a)

	Parameters		A1 G	A1 I	A2 G	A2 I	A3 G	A3 I
1	pH		6·5 to 8·5		5·5 to 9		5·5 to 9	
2	Coloration (after simple filtration)	mg/l Pt scale	10	20 (O)	50	100 (O)	50	200 (O)
3	Total suspended solids	mg/l SS	25					
4	Temperature	°C	22	25 (O)	22	25 (O)	22	25 (O)
5	Conductivity	μs/cm^{-1} at 20 °C	1 000		1 000		1 000	
6	Odour	(dilution factor at 25 °C)	3		10		20	
7*	Nitrates	mg/l NO_3	25	50 (O)		50 (O)		50 (O)
8 (*)	Fluorides	mg/l F	0·7 to 1	1·5	0·7 to 1·7		0·7 to 1·7	
9	Total extractable organic chlorine	mg/l Cl						
10*	Dissolved iron	mg/l Fe	0·1	0·3	1	2	1	
11*	Manganese	mg/l Mn	0·05		0·1		1	
12	Copper	mg/l Cu	0·02	0·05 (O)	0·05		1	
13	Zinc	mg/l Zn	0·5	3	1	5	1	5
14	Boron	mg/l B	1		1		1	
15	Beryllium	mg/l Be						
16	Cobalt	mg/l Co						
17	Nickel	mg/l Ni						
18	Vanadium	mg/l V						
19	Arsenic	mg/l As	0·01	0·05		0·05	0·05	0·1
20	Cadmium	mg/l Cd	0·001	0·005	0·001	0·005	0·001	0·005
21	Total chromium	mg/l Cr		0·05		0·05		0·05
22	Lead	mg/l Pb		0·05		0·05		0·05
23	Selenium	mg/l Se		0·01		0·01		0·01
24	Mercury	mg/l Hg	0·0005	0·001	0·0005	0·001	0·0005	0·001
25	Barium	mg/l Ba		0·1		1		1
26	Cyanide	mg/l Cn		0·05		0·05		0·05

	Parameters		A1 G	A1 I	A2 G	A2 I	A3 G	A3 I
27	Sulphates	mg/l SO_4	150	250	150	250 (O)	150	250 (O)
28	Chlorides	mg/l Cl	200		200		200	
29	Surfactants (reacting with methyl blue)	mg/l (laurylsulphate)	0·2		0·2		0·5	
30* (2)	Phosphates	mg/l P_2O_5	0·4		0·7		0·7	
31	Phenols (phenol index) paranitraniline 4 aminoantipyrine	mg/l C_6H_5OH		0·001	0·001	0·005	0·01	0·1
32	Dissolved or emulsified hydrocarbons (after extraction by petroleum ether)	mg/l		0·05		0·2	0·5	1
33	Polycyclic aromatic hydrocarbons	mg/l		0·0002		0·0002		0·001
34	Total pesticides (parathion, BHC, dieldrin)	mg/l		0·001		0·0025		0·005
35*	Chemical oxygen demand (COD)	mg/l O_2					30	
36*	Dissolved oxygen saturation rate	% O_2	> 70		> 50		> 30	
37*	Biochemical oxygen demand (BOD_5) (at 20 °C without nitrification)	mg/l O_2	< 3		< 5		< 7	
38	Nitrogen by Kjeldahl method (except NO_3)	mg/l N	1		2		3	
39	Ammonia	mg/l NH_4	0·05		1	1·5	2	4 (O)
40	Substances extractable with chloroform	mg/l SEC	0·1		0·2		0·5	
41	Total organic carbon	mg/l C						
42	Residual organic carbon after flocculation and membrane filtration (5 µ) TOC	mg/l C						
43	Total coliforms 37 °C	/100 ml	50		5 000		50 000	
44	Faecal coliforms	/100 ml	20		2 000		20 000	
45	Faecal streptococci	/100 ml	20		1 000		10 000	
46	Salmonella		Not present in 5 000 ml		Not present in 1 000 ml			

I = mandatory.
G = guide.
O = exceptional climatic or geographical conditions.
* = see Article 8 (d).

(1) The values given are upper limits set in relation to the mean annual temperature (high and low).
(2) This parameter has been included to satisfy the ecological requirements of certain types of environment.

New York State Classification and Standards for Surface Waters

Class and best use*	Water Standards†				
	Minimum dissolved oxygen ml/liter	Coliform bacteria median no/100 ml	pH	Toxic wastes, deleterious substances, colored wastes, heated liquids, odor producing substances ‡	Floating solids, settleable solids, oil, and sludge deposits
AA - Source of unfiltered public water supply and any other usage	5 0 (trout) 4 0 (nontrout)	Not to exceed 50	6.5–8.5	None in sufficient amounts or at such temperatures as to be injurious to fish life or make the waters unsafe or unsuitable.	None attributable to sewage, industrial wastes or other wastes.
A - Source of filtered public water supply and any other usage	5.0 (trout) 4.0 (nontrout)	Not to exceed 5000	6.5–8.5		None which are readily visible and attributable to sewage, industrial wastes or other wastes.
B - Bathing and any other usages except as a source of public water supply	5.0 (trout) 4.0 (nontrout)	Not to exceed 2400	6.5–8.5		
C - Fishing and any other usages except public water supply and bathing	5.0 (trout) 4.0 (nontrout)	Not applicable	6.5–8.5	None in sufficient amounts or at such temperatures as to be injurious to fish life or impair the waters for any other best usage.	
D - Natural drainage, agriculture, and industrial water supply	3.0	Not applicable	6 0–9.5	None in sufficient amounts or at such temperatures as to prevent fish survival or impair the waters for agricultural purposes or any other best usage.	

*Class B and C waters and marine waters shall be substantially free of pollutants that: unduly affect the composition of bottom fauna; unduly affect the physical or chemical nature of the bottom; interfere with the propagation of fish. Class D and SD (marine) will be assigned only where a higher water use class cannot be attained after all appropriate waste-treatment methods are utilized. Any water falling below the standards of quality for a given class shall be considered unsatisfactory for the uses indicated for that class. Waters falling below the standards of quality for Class D or SD (marine) shall be Class E or SE (marine), respectively, and considered to be in a nuisance condition.

†These Standards do not apply to conditions brought about by natural causes. Waste effluents discharging into public water supply and recreation waters must be effectively disinfected. All sewage-treatment plant effluents shall receive disinfection before discharge to a watercourse and/or coastal and marine waters. The degree of treatment and disinfection shall be as required by the state pollution control agency. The minimum average daily flow for seven consecutive days that can be expected to occur once in ten years shall be the minimum flow to which the standards apply.

‡Phenolic compounds cannot exceed 0 005 mg/liter; no odor-producing substances that cause the threshold-odor number to exceed 8 are permitted; radioactivity limits are to be approved by the appropriate state agency, with consideration of possible adverse effects in downstream waters from discharge of radioactive wastes, and limits in a particular watershed are to be resolved when necessary after consultation between states involved.

A3.3 cont'd

WHO Limits for Toxic Substances in Piped Water Supplies Compared with the Corresponding U.S.S.R., U.S.A. and proposed EEC Values (mg/l)

Substance	WHO limits		USSR values	USA values	EEC (maximum admissible concentrations)
	European	International			
Lead (as Pb)	0.1[a]	0.1	0.1	0.05	0.05
Arsenic (as As)	0.05	0.05	0.05	0.05	0.05
Selenium (as Se)	0.01	0.01	0.001	0.01	0.01
Chromium (Cr^6)	0.05	-	0.1	0.05	0.05
Chromium (Cr^3)	-	-	0.5	-	
Cadmium	0.01	0.01	0.01	0.01	0.005
Cyanide (as CN)	0.05	0.05	0.1	0.2	0.05
Mercury (as Hg)	-	0.001	0.005	0.002	0.001
Barium	1.0	-	4.0	1.0	0.1

[a] Where water undertakings still use lead piping, concentrations may be higher, but in no instances higher than 0.3 mg/l after 16 h contact with the pipes.

Trade effluent standards in Singapore, 1976

Parameter	Limit for Discharge into a Public Sewer (mg/l)	Limit for Discharge into a Watercourse other than a Controlled Watercourse (mg/l)	Limit for Discharge into a Controlled Watercourse (a) (mg/l)
PH	6-9	6-9	6-9
Temperature	45°C	45°C	45°C
Total Suspended Solids	400	50	30
Total Dissolved Solids	3,000	2,000	1,000
Chloride (as chloride ion)	1,000	600	400
Sulphate (as SO_4)	1,000	500	200
Sulphide (as sulphur)	1	0.2	0.2
Cyanide (as CN)	2	0.1	0.1
Chlorine (free)	-	1	1
Phosphates (as PO_4)	-	5	2
Nitrate (as NO_3)	-	-	20
Calcium and Magnesium	-	200	150
Detergents (b)	30	15	5
Grease and Oil	60	10	5
Arsenic	5	1	0.05
Barium	10	5	5
Tin	10	10	5
Iron (as Fe)	50	20	1
Beryllium	5	0.5	0.5
Boron	5	5	0.5
Manganese	10	5	0.5
Phenolic Compounds (expressed as phenol)	0.5	0.2	Nil
BOD (5-day)	400	50	20
COD	600	100	60
Metals:			
Cadmium	1	0.1	0.01
Chromium (trivalent and hexavalent)	5	1	0.05
Copper	5	0.1	0.1
Lead	5	0.1	0.1
Mercury	0.5	0.05	0.001
Nickel	10	1	0.1
Selenium	10	0.5	0.01
Silver	5	0.1	0.1
Zinc	10	1	0.5
Total metals	10	1	0.5

Notes:

(a) Water course from which water supplied by the Public Utilities Board under the Public Utilities Act is obtained

(b) Linear alkylate sulphonate as methylene blue active substances

Standards for Effluents discharged into Surface Waters and Public Sewers - Switzerland

Parameters	Quality standards for effluents discharged into surface waters	Quality standards for effluents discharged in public sewers
	The limit values must be met at all times during dry periods. Under certain conditions derogations are permitted.	The limit values are applicable to artisanal and industrial waste water and must be met always. In justified cases derogations can be permitted.
Temp.	Max. 30° C	Max. 60° C In sewer max. 40° C
Transparance Method Snellen	30 cm	No limit
Colour	May not cause colouration of receiving water	Dyes may be discharged if they are eliminated in the municipal treatment plant
Odour and taste	May not cause alteration of odour and taste of receiving water	Odour may not cause nuisance
Toxicity	No toxicity towards fish after 24 hours for undiluted to 5 x diluted effluent, depending on dilution ratio in receiving water	Effluent may not affect negatively the efficiency of the biological waste water treatment plant
Salts	Quality of the receiving water may not be detoriated	The sewer system and treatment plant, as well as the efficiency may not be detoriated
Total unsoluble matter	4 out of 5 composite samples must be lower than 20 mg/l (24 hr average)	To be set case by case
Settleable solids	Max. 0.3 mg/l after 2 hr settling time.	To be set case by case
pH	6.5 - 8.5 Up to 9.0 may be permitted if river flow is high enough	6.5 - 9.0 6.5 - 9.5 if prevailing conditions permit
Oxygen	In receiving water min. 6 mg O_2/l	No lower limit.
Surface tension	In receiving water: > 65 dyn/cm at 20° C	To be set case by case.
Al	10 mg Al/l	20 mg Al/l in influent to municipal treatment plant
As	0.1 mg As/l	0.1 mg As/l
Ba	5 mg Ba/l (dissolved)	To be set case by case.

A3.3 cont'd

Guidelines for Effluent Qualities of Waste Water - Denmark

receiving water / parameter	a lakes and streams to lakes and narrow fjords	b streams to open bays, sounds and the open sea	c narrow fjords	d open bays, sounds and the sea	remarks
pH	6,5-8,5	6,5-8,5	6-9	–	d to be fixed individually
temperature	30°C	30°C	30°C	30°C	
BOD_5	20 mg/l	20 mg/l	100 mg/l	400 mg/l	d higher limit values may be acceptable, to be discussed
COD	–	–	–	–	limit values to be fixed individually
N : $(NH_3+NH_4^+)$	2 mg/l	–	–	–	higher values may be accepted during winter period
total N	–	–	–	–	to be fixed after investigation of the receiving water system
total P	1 mg/l	–	1 mg/l	–	
sediment (after 2h.)	0,5 ml/l	0,5 ml/l	1 ml/l	1 ml/l	
floating matter		should not be visible			
dispersed material (total)	30 mg/l	30 mg/l	80 mg/l	–	
Hg	–	–	–	–	specially restricted
Cd	–	–	–	–	
$(Cr^{+3} + Cr^{+6})$	0,2 mg/l	0,2 mg/l	0,2 mg/l	0,2 mg/l	all emissions of metals should be reduced as low as possible; limit values should be followed by a max. total for grams/day
Cu	0,1 mg/l	0,1 mg/l	0,2 mg/l	0,5 mg/l	
Zn	0,5 mg/l	0,5 mg/l	1 mg/l	1 mg/l	
Pb	0,1 mg/l	0,1 mg/l	0,5 mg/l	0,5 mg/l	
Ni	0,2 mg/l	0,2 mg/l	0,5 mg/l	0,5 mg/l	
Ag	0,05 mg/l	0,05 mg/l	0,05 mg/l	0,1 mg/l	
As	0,5 mg/l	0,5 mg/l	0,5 mg/l	1 mg/l	

continued

A3.3 cont'd

receiving water / parameter	a lakes and streams to lakes and narrow fjords	b streams to open bays, sounds and the open sea	c narrow fjords	d open bays, sounds and the sea	remarks
CN	0,1 mg/l	0,1 mg/l	0,1 mg/l	0,2 mg/l see remark	d to be fixed individually, max. limit 2,0 mg/l
H_2S	2 mg/l	2 mg/l	5 mg/l	–	
Free Cl_2	0,3 mg/l	0,3 mg/l	0,5 mg/l	–	amount of free chlorine in effluent to fresh water systems should be reduced as low as possible
halogenated phenols	–	–	–	–	subject to special permission
phenols	0,2 mg/l	0,2 mg/l	0,2 mg/l	–	d to be fixed individually, max. limit 1 mg/l
stable oil emulsions of mineral oil	5 mg/l	5 mg/l	5 mg/l	10 mg/l	visible oil should be avoided
anionic detergents 80% degradable	2 mg/l	2 mg/l	5 mg/l	10 mg/l	
other synthetic detergents	–	–	–	–	to be fixed individually
halogenated hydrocarbons	–	–	–	–	to be kept at min. as specially restricted
organic solvents	–	–	–	–	to be fixed individually

(a) Danish Environmental Conservation Act

WHO Limits for Substances Affecting the Acceptability of Water for Domestic Purposes Compared with the Corresponding USSR, USA and Proposed EEC Values (mg/l)

Substance	WHO limits			USSR limits	USA limits	Proposed EEC limits	
	European	International					
		Highest desirable	Maximum permissible			Guide level	Maximum admissible concentration
Phenolic compounds (as phenol)	0.001	0.001	0.002	0.001	–	–	0.0005
Fluoride (as F)	1.0-1.7[a]	–	0.8-1.7[a]	0.7-1.5[b]	1.4-2.4[a]	–	0.7-1.5[a]
Nitrate (as NO_3)	50-100	–	–	10 (as N)	10 (as N)	–	50
pH	–	7.0-8.5	6.5-9.2	6.5-8.5	–	6.5-8.5	9.5
Copper (as Cu)	0.05[c]	0.05	1.5	1.0	–	–	0.05[c]
Iron (as Fe)	0.1[c]	0.1	1.0	0.3	–	0.1	0.3
Manganese as Mn)	0.05	0.05	0.5	0.1	–	0.02	0.05
Zinc (as Zn)	5.0	5.0	15.0	5.0	–	–	0.1[c]
Magnesium (as Mg)	30-125[d]	30-150[d]	150	–	–	30	50
Sulphate (as SO_4)	250	200	400	500	–	5	250
Hydrogen sulphide (as H_2O)	0.05	–	–	Sulphides: nil	–	–	nil
Chloride (as Cl)	200-600	200	600	350	–	5	200
Chlorine, free	–	–	–	Nil	–	–	–
Anionic detergents	0.2	0.2	1.0	Individual limits	–	–	0.1
Ammonia (as NH_4)	0.05	–	–	2.0 (as N)	–	0.05	0.5
Carbon dioxide, free	nil	–	–	–	–	–	–
Calcium (as Ca)	–	75	200	–	–	100	–
Mineral oil	–	0.01	0.3	0.5	–	–	0.01
Mineral oil with high S content	–	–	–	0.1	–	–	–
Turbidity (units)	–	5	25	1.5	1[e]	5	10
Organics[e]	0.2-0.5	–	–	–	0.7	0.1	–

(a) Depending on temperature
(b) Varies according to climatic zone
(c) Under certain circumstances higher levels
(d) Depending on sulphate concentration
(e) Carbon chloroford extract

Selection of State and National Standards for Surface Waters used as Sources of Drinking Water (See text for references)

Parameter	U.S.A.- EPA recommended maximum	Canada - Saskatchewan State (2)	Brazil - Sao Paulo State (3)	Federal Republic of Germany A (4)	Federal Republic of Germany B (5)	Switzerland (6)
pH	5.0-9.0	6.5-8.5	-	-	-	Natural pH
Colour (Pt scale)	75	≤30 above natural	Note (c)	5	50	Nil
Ammonia (as N)	0.5	-	0.5	0.2(d)	1.5(d)	0.5
Arsenic	0.1	0.01	0.1	0.01	0.03	0.01
Barium	1.0	1.0	1.0	1.0	1.0	0.5
Cadmium	0.01	0.01	0.01	0.005	0.01	0.005
Chloride	250	-	-	100	200	100
Chromium	0.05	0.05	0.05	0.03	0.05	0.06
Cobalt	-	-	-	0.05	0.05	0.05
Copper	1.0	0.02	1.0	0.03	0.05	0.01
Cyanide	0.2	0.01	0.2	0.01	0.05	0.01
Fluoride	1.4-2.4(a)	1.5	1.4	1.0	1.0	1.0
Foaming agents	0.5	0.5	-	-	-	-
Iron (Fe^{2+})	0.3	0.3	-	0.1	1.0	1.0
Lead	0.05	0.05	0.1	0.03	0.05	0.05
Magnesium	-	-	-	30.0	-	-
Manganese (Mn^{2+})	0.05	0.05	-	0.05	0.5	-
Mercury	0.002	0.0001	0.002	0.0005	0.001	0.001
Nitrate (as N)	10.0	-	10.0	25(e)	50(e)	25(e)
Nitrite (as N)	1.0	-	1.0	-	-	No toxicity
Nitrogen (total)	-	1.0	-	-	-	-
Organics	0.3 (b)(f)	0.2(b)(f)	-	Note (f)	Note (f)	Note (f)
Oil and grease	Note (c)	Note (c)	Note (c)	-	-	-
Phenolic compounds	0.001	0.005	0.001	0.005	0.01	0.005
Selenium	0.01	0.01	0.01	0.01	0.01	-
Sulphate	250	-	-	100	150	100
Zinc	5.0	0.05	5.0	0.5	1.0	0.2
Boron	-	0.5	-	1.0	1.0	1.0
Sulphide	-	0.05	-	-	-	No toxicity
Silver	-	0.05	-	-	-	0.01
Nickel	-	-	-	0.03	0.05	0.05
Vanadium	-	-	-	0.05	0.05	-
Tin	-	-	2.0	-	-	0.5
Beryllium	-	-	-	0.0001	0.0002	-

Source: UNEP "Guidelines for Assessing Industrial Environmental Impact and

Summary of Specific Quality Characteristics of Surface Waters that have been Used as Sources for Industrial Water Supplies[a].

Characteristic	Boiler Makeup Water		Cooling Water				Process Water							
			Fresh		Brackish									
	Industrial 0-1 500 psig	Utility 700 - 5 000 psig	Once Through	Makeup Recycle	Once Through	Makeup Recycle	Textile Industry SIC-22	Lumber Industry SIC-24	Pulp and Paper Industry SIC-26	Chemical Industry SIC-28	Petroleum Industry SIC-29	Primary Metals Industry SIC-33	Food and Kindred Products SIC-20	Leather Industry SIC-31
Silica (S_iO_2)	150	150	50	150	25	25	-	-	50	-	50	-	For the above 2 categories, the quality of raw surface supply should be that prescribed by the MIS subcommittee on Water Quality Requirements for Public Water Supplies	
Aluminum	3	3	3	3	-	-	-	-	-	-	-	-		
Iron (Fe)	80	80	14	80	1.0	1.0	0 3	-	2.6	6	15	-		
Manganese (Mn)	10	10	2.5	10	0.02	0.01	1 0	-	-	2	-	-		
Copper (Cu)	-	-	-	-	-	-	0 5	-	-	*	-	-		
Calcium (Ca)	-	-	500	500	1 200	1 200	-	-	-	200	220	-		
Magnesium (Mg)	-	-	-	-	-	-	-	-	-	100	85	-		
Sodium and Potassium (Na+K)	-	-	-	-	-	-	-	-	-	-	230	-		
Ammonia (NH_3)	-	-	-	-	-	-	-	-	-	-	-	-		
Bicarbonate (HCO_2)	600	600	600	600	180	180	-	-	-	600	480	-		
Sulfate (SO_4)	1 400	1 400	680	680	2 700	2 700	-	-	-	850	570	-		
Chloride (Cl)	19 000	19 000	600	500	22 000	22 000	-	-	200[b]	600	1 600	500		
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	1.2	-		
Nitrate (NO_3)	-	-	30	30	-	-	-	-	-	-	8	-		
Phosphate (PO_4)		50	4	4	5	5	-	-	-	-	-	-		
Dissolved Solids	35 000	35 000	1 000	1 000	35 000	35 000	150	-	1 080	2 500	3 500	1 500		
Suspended Solids	15 000	15 000	5 000	15 000	250	250	1 000	c	-	10 000	5 000	3 000		
Hardness ($CaCO_3$)	5 000	5 000	850	850	7 000	7 000	120	-	475	1 000	900	1 000		
Alkalinity ($CaCO_3$)	500	500	500	500	150	150	-	-	-	500	-	200		
Acidity ($CaCO_3$)	1 000	1 000	0	200	0	0	-	-	-	-	-	75		
pH, Units	-	-	5.0-8.9	3.5-9.1	5 0-8.4	5.0-8.4	6.0-8.0	5-9	4.6-9.4	5.5-9.0	6.0-9.0	3-9		
Color, Units	1 200	1 000	-	1 200	-	-	-	-	360	500	25	-		
Organics.														
Methylene blue active substances	2[d]	10	1.3	1.3	-	1 3	-	-	-	-	-	-		
Carbon tetrachloride extract	100	100	e	100	e	100	-	-	-	-	-	30		
Chemical oxygen demand (O_2)	100	500	-	100	-	200	-	-	-	-	-	-		
Hydrogen sulfide (H_2S)	-	-	-	-	4	4	-	-	-	-	-	-		
Temperature, °F	120	120	100	120	100	12	-	-	94[f]	-	-	100		

Notes. a) Unless otherwise indicated, units are mg/l and values are maximums, no one water will have all the maximum values shown (Hann, 1972)
b) Water containing in excess of 1 000 mg/l dissolved solids.
c) May be < 1 000 for mechanical pulping operations
d) No large particles < 3 mm diameter.
e) 1 mg/l for pressures up to 700 psig.
f) No floating oil.
g) Applied to bleached chemical pulp and paper only.

A3.4 EXAMPLES OF NOISE CRITERIA

Human Effects for Outdoor Day-Night Average Sound Level

Type of Effects / Noise Level	55 dBA	65 dBA	75 dBA
Speech – Indoors	No disturbance of speech with 100% sentence intelligibility (average) and a 5-dB margin of safety.	Slight disturbance of speech with 99% sentence intelligibility (average) and a 4-dB margin of safety.	Some disturbance of speech with sentence intelligibility (average) less than 99%
– Outdoors	Slight disturbance of speech with 100% sentence intelligibility (average) at 0.35 meter,	Significant disturbance of speech 100% sentence intelligibility (average) at 0.1 meter,	Very significant disturbance of speech with 100% sentence intelligibility not possible at any distance.
	or	or	or
	99% sentence intelligibility (average) at 1.0 meter,	99% sentence intelligibility (average at 0.35 meter,	99% sentence intelligibility (average) at 0.1 meter,
	or	or	or
	95% sentence intelligibility (average) at 3.5 meters.	95% sentence intelligibility (average) at 1.2 meters.	95% sentence intelligibility (average) at 0.35 meter.
Average Community Reaction	None; 7 dB below level of significant "complaints and threats of legal action" and at least 16 dB below "vigorous action" (attitudes and other nonacoustical factors may modify this effect)	Significant, 3 dB above level of significant "complaints and threats of legal action" but at least 7 dB below "vigorous action" (attitudes and other nonacoustical factors may modify this effect).	Very severe; 13 dB above level of significant "complaints and threats of legal action" and at least 3 dB above "vigorous action" (attitudes and other nonacoustical factors may modify this effect)
High Annoyance	Depending on attitude and other nonacoustical factors, approximately 5% of the population will be highly annoyed.	Depending on attitude and other nonacoustical factors, approximately 15% of the population will be highly annoyed.	Depending on attitude and other nonacoustical factors, approximately 37% of the population will be highly annoyed
Attitudes Towards Area	Noise essentially the least important of various factors	Noise is one of the most important adverse aspects of the community	Noise is likely to be the most important of all adverse aspects of the community

Criteria for Outdoor Sound Levels for Analysis of Environmental Noise Impact for Various Land Uses

Land Use	L_{dn} (dB)	L_{eq} (dB)
Residential[a]	55	
Hospital[a]	55	
Motel, Hotel[a]	60	
School Buildings and Outdoor Teaching Areas[a]		60
Church[b]		60
Office Buildings[b]		70
Theater		70
Playgrounds, Active Sports		70
Parks		60
Special Purpose Outdoors Areas		c

[a] 15 dB - windows open

[b] 25 dB - windows closed

[c] For outdoor amphitheaters or other critical land uses requiring special consideration, the hourly average sound level (L_h) due to the new intruding noise should not be allowed to be higher than 5 dB below the existing hourly average sound level in the absence of speaking in the amphitheater.

. Summary of Preparation of a Noise Impact Analysis

Type of Environment	Type of Criteria	Recommended Noise Measure	Assessment Methodology Used
General Audible Noises (including low-level impulse noise)	Potential for loss of hearing	Day-night average sound level	Population-weighted loss of hearing (PLH)
	Health and welfare effects on people, $L_{dn} > 55$	(a) Day-night average sound (b) Word description	(a) Sound level-weighted population (LWP) and noise impact index (NII) (b) Descriptions of the effects
	Environmental degradation/improvement on people/animals, $L_{dn} > 35$		
Special Noises Large, Impulse, Sonic Boom, Blast, Artillery	Structural damage	(a) Peak pressure (b) Empirical formulas (c) Peak acceleration (weighted)	(a) 200 Pa limit outside (b) Listing of predicted damage as to amount and type (c) 1 meter/sec^2 inside
	Annoyance due to auditory stimulation and building vibration	Composite day-night average sound level using C-weighted sound exposure level for impulses	Sound level-weighted population (LWP) and noise impact index (NII)
Other	Other (infrasound, ultrasound, etc.)	Maximum sound pressure level	Discussion of possible effects No quantification made
Vibration	Structural damage	Peak acceleration (weighted)	1 meter/sec^2 for most structures 0.5 meter/sec^2 for sensitive structures 0.05 meter/sec^2 for certain ancient monuments
	Annoyance and complaints	RMS acceleration (weighted) vs time of exposure	Uses no complaint level for threshold of any adverse effects. Some quantification possible using vibration impact index

A3.4. cont'd

State Recreational and Off-Road Vehicle Noise Regulations
(all levels in decibels measured at 50 ft unless noted otherwise)

State	Vehicle Type	Vehicles in Operation		New Vehicle Sales		Comments
		Effective Date	Maximum Level	Date of Manufacture	Maximum Level	
Federal	Off-road	None	None	None	None	
California	Snowmobile	After 1972	82	Not specified	Not specified	
	Off-road, self-propelled	Not specified	Not specified	After 1-1-72 After 1-1-73 After 1-1-75	92 88 86	
Colorado			86 (over 35 mph	After 1-1-71 After 1-1-73	86 84	
	Off-road, self-propelled	Not specified	82 (under 35 mph	After 1-1-74 After 1-1-75	79 74	
Connecticut	Snowmobile	Before 1-1-75 After 1-1-75	82 73	– –	– –	Test procedures, SAE practice J192.[a]
	Off-road, self-propelled	Before 1-1-75 After 1-1-75	80 73	– –	– –	
Iowa	Snowmobile	Not specified	86	After 7-1-73	82	Test procedure–rules to be adopted by Commission.
Maine	Snowmobile	–	–	After 10-1-73 After 2-1-75	82 78	Test procedure: SAE practice J192.[a]
Massachusetts	Snowmobile	Not specified	73	Not specified	73	Test procedure: ISIA 1969[b] or other
	Off-road, self-propelled	Not specified	73	Not specified	73	standard for measurement as registrar of motor vehicles adopts.
Michigan	Snowmobile	Not specified	82	After 2-1-72	82	Test procedure–SAE practice J192.[b]
New Hampshire	Off-road, self-propelled	After 7-1-73 After 7-1-78 After 7-1-83	82 73 70	–	–	Test procedure–ISIA 1969[b] or other standard of measurement as adopted by commissioner.
Oregon	Snowmobile	–	–	1975 1976-1978 After 1978	82 78	
	Off-road, self-propelled	Before 1975 1976 1976-1978 After 1978	94[c]/88[d] 91[c]/85[d] 88[c]/82[d] 83[c]/77[d]	–	-	
Vermont	Snowmobile	9-1-72 9-1-73	82 To be established	–	–	No test procedure given.
Wisconsin	Snowmobile	–	–	After 7-1-72 After 7-1-75	82 78	Test procedures SAE.[c] Practice J192.

[a]Society of Automotive Engineers, Recommended Practice J192 "Exterior Sound Level for Snowmobiles."
[b]International Snowmobile Industry Association (January 1969) "Procedure for Sound Level Measurements of Snowmobiles."
[c]Stationary at 25 ft.
[d]Moving at 50 ft.
[e]The logarithmic ratio of a particular quantity, such as sound pressure intensity, or power, to a reference level, commonly the threshold of human hearing.

Source: Golden J., Oulette R., Saari S., Cheremisinoff P., "Environmental Impact Data Book." Ann Arbor Science, U.S.A. 1980.