

## **Part C**

# **Appendices**

## **Appendix 1: Potential sources and uses of chemicals considered in the WHO *Guidelines for Drinking-water Quality***

This appendix lists the chemicals considered in the third edition of the World Health Organization (WHO) *Guidelines for Drinking-water Quality* (WHO, 2004) and their primary sources. Table A1.1 covers chemicals considered for a health-based guideline value (in cases where a health-based value was not considered to be appropriate, no value was assigned). Table A1.2 covers chemicals that affect the acceptability of drinking-water. The values given in tables A1.1 and A1.2 are only a guide — local circumstances need to be considered when determining national or local standards, or when assessing priorities for action (including monitoring). The WHO *Guidelines for Drinking-water Quality* give more detailed information on the individual chemicals, which may be helpful in setting standards or assessing priorities.

Tables A1.1 and A1.2 also list the major uses of each chemical and the specific industries that may discharge the chemical (classified by the United Nations (UN) industry/process code numbers, details of which are given in Appendix 2). The lists are not comprehensive, because there may be considerable variation in the uses of chemicals by individual industries in different countries and regions. However, the information given may be useful to water authorities and related agencies when preparing an inventory of potential chemical contaminants within a catchment. Some of the uses listed may be very minor, but are nevertheless included in the list because it is not clear that they can be ignored when assessing the potential for contamination from industrial sources.

Pesticides, which may also arise from industrial sources when the pesticides are manufactured or formulated, are covered in Appendix 3.

**Table A1.1 Chemicals considered for health-based guideline values\***

\*In some cases, substances were considered but no guideline value was proposed, because a health-based guideline was not considered appropriate.

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Acrylamide <sup>b</sup>	0.5				(X)	X	Chemical intermediate; monomer in the production of polyacrylamide; production of flocculants; grouting agents	3511, 3513, 3529, 354, 4
Alachlor	20		X		(X)		Pre- or early post-emergence herbicides to control annual grasses and broad-leaved weeds	111, 3512
Aldicarb	10		X		(X)		Insecticides to control nematodes in soil and insects and mites on a wide variety of crops	111, 3512
Aldrin/dieldrin	0.03		X		(X)		Insecticides for termite control	111, 3512
Antimony	20	(X)			(X)	(X)	Semiconductor alloy; batteries; antifriction compounds; ammunition; cable sheathing; flameproofing compounds; ceramics; glass; pottery; type castings for commercial printing; solder alloys; fireworks; treatment of parasitic diseases; pesticides	23, 3210, 342, 3512, 3522, 361, 362, 372, 38, 932
Aromatic hydrocarbons ( <i>see benzene, toluene, xylenes, ethylbenzene, styrene</i> )								
Arsenic	10 <sup>d</sup>	X			(X)		Alloying agents in the manufacture of transistors, lasers, and semiconductors; processing of glass, pigments, textiles, paper, metal adhesives, wood preservatives and ammunition; hide tanning process; pesticides; feed additives; pharmaceuticals	111, 12, 23, 3121, 32, 341, 3512, 3521, 3522, 362, 372, 38

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Atrazine	2		X	(X)	(X)		Pre- and post-emergence herbicides for the control of weeds	111, 3512
Barium	700	X					Plastics; rubber; electronics; ceramic glazes and enamels; glass-making; brick-making; paper-making; lubricant additive; pharmaceuticals and cosmetics; case-hardening of steel; oil and gas industries as a wetting agent for drilling mud	22, 23, 341, 3513, 3521, 3522, 354, 355, 362, 3691, 372, 38
Bentazone <sup>f</sup>			X		(X)		Herbicides used in winter and spring cereals	111, 3512
Benzene	10			X	(X)		For the production of styrene/ethylbenzene, cumene/phenol, and cyclohexane; as a solvent; as an additive in petrol to increase the octane number	3511, 3521, 353, 354,
Benzo[a]pyrene	0.7					(X)	Incomplete combustion of organic material, forest fires and volcanic eruptions; incomplete combustion of fossil fuels, coke oven emissions, aluminium smelters, vehicle exhausts	37, 4101, 7
Beryllium <sup>f</sup>		(X)			(X)		Specialised metal working and alloys such as munitions	
Boron <sup>e</sup>	500	X		X	X		High-temperature abrasives; special-purpose alloys; steel-making; catalysts in the manufacture of magnesium alloy products; metal refining; control of heavy metal discharges in wastewater; jet and rocket fuels; glass manufacture; wood and leather preservation; flame retardants; cosmetic products; neutron absorbers; mild antiseptics or bacteriostats in eyewashes; mouthwashes; burn dressings; nappy rash powders; cleaning compounds; agricultural fertilizers; algicides; herbicides; insecticides	111, 12, 23, 323, 3512, 3522, 3529, 362, 37, 932

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Bromate <sup>e</sup>	10				(X)	X	(Disinfection by-product); permanent wave neutralizing solutions; flour maturing agent; dough conditioning agent; fish paste; beer and cheese	3112, 3114, 3116, 3133, 3529, 92
Bromodichloromethane	60					X	(Disinfection by-product); laboratory reagents; chemical intermediates for the synthesis of organic compounds; fluids for mineral ore separation; solvent for fats, waxes and resins; flame retardants	23, 3511, 3529, 354
Bromoform	100					X	(Disinfection by-product); laboratory reagents; chemical intermediates for the synthesis of organic compounds; fluids for mineral ore separation; solvent for fats, waxes and resins; flame retardants; sedative and cough suppressant	23, 3511, 3529, 354, 932
Cadmium	3	(X)			X		Anticorrosive; electroplated steel; pigments in plastics; electric batteries; electronic components; nuclear reactors	23, 3522, 372, 38
Carbofuran	7		X		(X)		Systemic acaricides; insecticides; nematocides	111, 3512
Carbon tetrachloride	4			X	X		Production of chlorofluorocarbon refrigerants and foam-blowing agents; solvents; manufacture of paints and plastics; metal cleaning solvent; fumigants	111, 351, 3521, 354, 38
Chloral hydrate	10					X	(Disinfection by-product); sedative and hypnotic in human and veterinary medicine	3522, 3529, 354, 932
Chlorate D	700					X	(Disinfection by-product); preparation of chlorine dioxide; manufacture of dyes, matches and explosives; tanning and finishing leather; herbicides and defoliant	111, 3529
Chlordane	0.2		X		(X)		Versatile, broad-spectrum contact insecticides for non-agricultural purposes	3512, 354

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Chlorinated acetic acids ( <i>see monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, chloral hydrate</i> )								
Chlorinated alkanes( <i>see carbon tetrachloride, dichloromethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1,1-trichloroethane</i> )								
Chlorinated benzenes ( <i>see monochlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, Trichlorobenzene</i> ) <sup>f</sup>								
Chlorinated ethenes ( <i>see vinyl chloride, 1,1-dichloroethene, 1,2-dichloroethene, trichloroethene, tetrachloroethene</i> )								
Chlorate D	700					X	(Disinfection by-product); preparation of chlorine dioxide; manufacture of dyes, matches and explosives; tanning and finishing of leather; herbicides and defoliants	111, 3529
Chlorine <sup>c</sup>	5 mg/l					X	Disinfectants and bleach for domestic and industrial purposes; disinfection of drinking-water and swimming-pools; control of bacteria and odours in the food industry	31, 3511, 3529, 4, 94
Chlorite D	700					X	(Disinfection by-product); on-site production of chlorine dioxide; bleaching agent in the production of paper, textiles, and straw products; manufacture of waxes, shellacs and varnishes	3529
Chloroform	200				(X)	X	(Disinfection by-product); production of chlorodifluoromethane (refrigerant); extraction solvent for resins, gums and other products; fumigants; anaesthetic	111, 3511, 3512, 3529, 354, 932
Chlorophenols ( <i>see 2-chlorophenol, 2,4-dichlorophenol, 2,4,6-trichloropheno</i> )								
Chlorotoluron	30		X		(X)		Pre- and post-emergence herbicides	111, 3512
Chlorpyrifos	30						Acaricides; insecticides; nematicides	111, 3512

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Chromium	50 <sup>d</sup>	(X)			(X)		The leather tanning industry; manufacture of catalysts; pigments and paints; fungicides; the ceramics and glass industries; photography; chrome alloy; chromium metal production; chrome plating; corrosion control	111, 23, 3231, 3512, 3521, 3522, 361, 362, 372, 38, 94
Copper	2			(X)	(X)	X	Water pipes; roof coverings; household goods; chemical equipment; the arts; alloys; pest control; inorganic dyes; feed additives; photography; seed disinfectants; fungicides; algicides; electroforming	111, 23, 3512, 3522, 3529, 372, 4, 94
Cyanazine	0.6		X		(X)		Herbicides	111, 3512
Cyanide	70	(X)			X		Electroplating	371, 38, 41
Cyanogen chloride (as CN)	70					X	(Disinfection by-product); tear gas; fumigant gases; reagent in the synthesis of other compounds	111, 3512, 354
2,4-D	30		X		(X)		Systemic chlorophenoxy herbicides	111, 3512
2,4-DB	90		X		(X)		Post-emergence herbicides to control broad-leaved annual and perennial weeds in variety of agricultural crops	111, 3512
DDT and metabolites	2		X		(X)		Nonsystemic contact insecticide with a broad spectrum of activity	111, 3512
Dibromoacetonitrile	70					X	(Disinfection by-product)	
Dibromochloromethane	100					X	(Disinfection by-product); laboratory reagents; chemical intermediates for the synthesis of organic compounds; fluids for mineral ore separation; solvent for fats, waxes and resins; flame retardants	23, 3511, 3529, 354
1,2-dibromo-3-chloropropane	1		X				Nematocidal fumigants	111, 3512

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
1,2-Dibromoethane	0.4						Insecticide	111, 3512
Dichloroacetic acid	50				(X)	X	(Disinfection by-product); chemical intermediate of synthesis of organic materials; pharmaceuticals and medicines; topical astringent; fungicides	111, 3511, 3512, 3522, 3529, 354
Dichloroacetonitrile	20 <sup>d</sup>				(X)	X	(Disinfection by-product)	
1,2-dichlorobenzene <sup>c</sup>	1 mg/l				X		Odourmasking agents; dyestuffs; pesticides	111, 3512
1,4-dichlorobenzene <sup>c</sup>	300				X		Odourmasking agents; dyestuffs; pesticides	111, 3512
1,2-dichloroethane	30				X		Production of vinyl chloride; solvent; lead scavenger in lead petrol	3511, 3521, 354,
1,1-dichloroethene	30				X		Monomer in the production of polyvinylidene chloride co-polymers; intermediate in the synthesis of other organic chemicals	3511, 354
1,2-dichloroethene	50				X		Intermediate in the synthesis of chlorinated solvents and compounds; extraction solvent for organic materials	3511, 354
Dichloromethane	20			(X)	X		Organic solvent; paints; insecticides; degreasing and cleaning fluids	111, 3512, 3521, 354, 38
1,2-dichloropropane	40 <sup>d</sup>		X		(X)		Chemical intermediate; lead scavenger for antiknock fluids; dry-cleaning solvent; soil fumigants; scouring compound; spotting agent; metal-degreasing agent	111, 3511, 3512, 3529, 354, 952
1,3-dichloropropene	20		X		(X)		Soil fumigants	111, 3512
Dichlorprop	100		X		(X)		Post-emergence herbicides to control broad-leaved annual and perennial weeds in variety of agricultural crops	111, 3512

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Di(2-ethylhexyl)adipate <sup>f</sup>					X			
Di(2-ethylhexyl)phthalate	8			X	X		Plasticiser in many flexible plastics.	
Dimethoate	6		X		(X)		Acaricides; insecticides; nematocides	111, 3512
Diquat <sup>f</sup>			X		(X)		Herbicides	111, 3512
Edetic acid (EDTA)	600			X	X		Treatment of lead poisoning in humans and domestic animals; laundry detergents; cosmetics; photochemicals; pharmaceuticals; galvanizing; water softening; electroplating; polymerization; textile treatments; paper production	3210, 341, 3513, 3529, 354, 38, 95
Endosulfan <sup>f</sup>			X		(X)		Acaricides; insecticides	111, 3512
Endrin	0.6						Acaricides; insecticides	111, 3512
Epichlorohydrin <sup>c</sup>	0.4 <sup>d</sup>					X	Avicides; insecticides	111, 3512
Ethylbenzene <sup>c</sup>	300			X	X		In xylene mixtures (15-20%); paint industry; insecticide sprays; petrol blends; production in the styrene and acetophenone, solvent; constituent of asphalt and naphtha	3511, 3512, 3521, 354, 38
Fenitrothion <sup>f</sup>			X		(X)		Insecticides	111, 3512
Fenoprop	9		X		(X)		Post-emergence herbicides to control broad-leaved annual and perennial weeds in variety of agricultural crops	111, 3512
Fluoranthene							Incomplete combustion of organic material, forest fires and volcanic eruptions; incomplete combustion of fossil fuels, coke oven emissions, aluminium smelters, vehicle	37, 4101, 7

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Fluoride	1.5 mg/l	X			(X)		Aaluminium production; flux in the steel and glass fibre industries; production of phosphate fertilizers, bricks, tiles, and ceramics; water fluoridation schemes	351, 361, 362, 3691, 37, 4
Formaldehyde	900				(X)	X	(Disinfection by-product); production of urea-formaldehyde, phenolic, melamine, pentaerythritol and polyacetal resins; industrial synthesis of a number of organic compounds; cosmetics; fungicides; textiles; embalming fluids	3210, 322, 351, 3529, 354
Glyphosate and AMPA							Herbicides	111, 3512
Heptachlor and heptachlorepoide <sup>f</sup>			X		(X)		Soil and seed treatment to control ants, cutworm and any other insects; to control household insects and pests of human and domestic animals	3512, 354
Hexachlorobenzene <sup>f</sup>					(X)		Fungicides; chemical processes by-product; impurity in some pesticides	111, 3512, 354
Hexachlorobutadiene	0.6				(X)	(X)	Solvent in chlorine gas production; intermediate in the manufacture of rubber compounds; lubricant; gyroscopic fluid; pesticides; fumigants in vineyards	111, 3511, 3512, 3529, 354, 355, 38
Isoproturon	9		X		(X)		Herbicides	111, 3512
Lead	10	(X)			(X)	X	Lead acid batteries; solder; alloys; cable sheathing; pigment; rust inhibitors; ammunition; glazes; plastic stabilizers; antiknock compounds in petrol; plumbing fittings; solder; lead pipes	23, 3513, 3529, 353, 361, 372, 38
Lindane	2		X		(X)		Insecticides; seed treatment; therapeutic pesticides in humans and animals	111, 3512, 932
Malathion							Acaricides; insecticides	111, 3512

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Manganese <sup>c</sup>	400	X			(X)		Iron, steel, and other alloys; batteries; glass; fireworks; oxidant for cleaning, bleaching and disinfection purposes	23, 3529, 362, 37, 38
MCPA	2		X		(X)		Herbicides	111, 3512
Mecoprop	10		X		(X)		Herbicides; plant growth regulators	111, 3512
Mercury (total)	1	(X)			X		Cathode in the electrolytic production of chlorine and caustic soda; lamps; arc rectifiers; mercury cells; switches; thermometers; barometers; laboratory apparatus; dental amalgams; raw material for various mercury compounds; fungicides; antiseptics; preservatives; pharmaceuticals; electrodes; reagents	111, 23, 3511, 3512, 3522, 362, 372, 38, 932
Methoxychlor	20		X		(X)		Insecticides	111, 3512
Metolachlor	10		X		(X)		Herbicides	111, 3512
Microcystin-LR	1						Toxin from blue-green algae (cyanobacteria).	
Molinate	6		X		(X)		To control germinating and grassy weeds	111, 3512
Molybdenum	70	(X)	(X)		X		Special steel; electrical contacts; spark plugs; X-ray tubes; filaments; screens; grids for radio valves; production of tungsten, glass-to-metal seals, nonferrous alloys and pigments; lubricant additive; direct treatment of seeds; formulation of fertilizer to prevent molybdenum deficiency	23, 354, 362, 37, 38
Monochloramine <sup>c</sup>	3 mg/l					X	(Disinfection by-product); intermediates in the manufacture of hydrazine; disinfectants for drinking-water	3529
Monochloroacetic acid	20				(X)	X	(Disinfection by-product); intermediate or reagent in the synthesis of a variety of chemicals; pre-emergence herbicides	111, 3511, 3512, 3529, 354

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Monochlorobenzene <sup>f</sup>					X		Solvent in pesticide formulation; degreasing agent; intermediate in the synthesis of 'other' halogenated organic compounds	111, 3511, 3512, 354, 38
Nickel	20	(X)		(X)	(X)	(X)	Alloys, including stainless steel, batteries, chemicals, catalysts and the electrolytic coating of items such as chromium-plated taps and fittings used for tap water	23, 3529, 37, 38
Nitrate (as NO <sub>3</sub> <sup>-</sup> )	50 mg/l		X	X			Inorganic fertilizers; oxidizing agent; production of explosives; glass making	29, 3511, 3512, 3529, 362
Nitilotriacetic acid (NTA)	200			(X)	X		Builder in laundry detergents; treatment of boiler water to prevent the accumulation of mineral scale; photography; textile manufacture; paper and cellulose production; metal plating and cleaning operations; therapeutic chelating agent for the treatment of manganese poisoning and iron overloading	3210, 341, 3529, 354, 38, 932, 94, 95
Nitrite (as NO <sub>2</sub> <sup>-</sup> )	3 mg/l		(X)	X		(X)	Food preservation, especially in cured meats	3111, 3529
Pendimethalin	20		X		(X)		Herbicides	111, 3512
Pentachlorophenol	9 <sup>d</sup>		X		(X)		Fungicides; herbicides; insecticides; molluscicides; plant growth regulators	111, 3512
Permethrin <sup>f</sup>			X		(X)		Contact insecticides	111, 3512
Selenium	10	X					Photocopy machine photoreceptor; colouring agent for heat-absorbing glass; decolouring agent for lead glass; electronic devices; television cameras, photoelectric cells; magnetic core for calculators; solar cells; catalytic agents	23, 372
Simazine	2		X		(X)		Pre-emergence herbicides	111, 3512

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Styrene <sup>c</sup>	20			(X)	X		Production for the plastics and resins	3513, 354
2,4,5-T	9		X		(X)		Plant growth regulators; herbicides	111, 3512
Terbutylazine (TBA)	7		X		(X)		Herbicides	111, 3512
Tetrachloroethene	40			X	X		Solvent in the dry-cleaning industry; degreasing solvent in metal industries; a heat transfer medium; manufacture of fluorohydrocarbons	3511, 354, 38, 952
Toluene <sup>c</sup>	700			(X)	X		Solvent for paint, coatings, gums, oils and resins; raw material in the production of benzene, phenol, and other organic solvents; bending of petrol	3511, 3513, 3521, 353, 354, 38
Trichloroacetaldehyde (See Chloral hydrate)								
Trichloroacetic acid	200				(X)	X	(Disinfection by-product); intermediate in the synthesis of organic chemicals; laboratory reagent; herbicides; soil sterilizer; antiseptic	111, 3511, 3512, 3529, 354
Trichloroacetonitrile <sup>f</sup>						X	(Disinfection by-product); insecticides	111, 3512
Trichlorobenzenes (tot) <sup>c,f</sup>					X		Intermediate in chemical synthesis; coolant; lubricant; heat-transfer medium; polyester dyeing; termite-control preparations; insecticides	111, 3210, 3211, 3511, 3512, 354, 38
1,1,1-Trichloroethane <sup>f</sup>					X		Cleaning solvent for electrical equipment, motors, electronic instruments and upholstery; solvent for adhesives, coatings and textile dyes; coolant and lubricant in metal cutting oils; component of inks and drain cleaners	3529, 354, 38

Chemical	Guideline value (µg/l unless otherwise specified)	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
		Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Trichloroethene	70			(X)	X		Dry cleaning; degreasing of fabricated metal parts; solvent for fats, waxes, resins, oils, rubber, paints and varnishes; inhalation analgesic and anaesthetic	3513, 3521, 354, 38, 932, 952
2,4,6-trichlorophenol <sup>c</sup>	200				(X)	X	(Disinfection by-product); production of 2,3,4,6-tetrachlorophenol and pentachlorophenol; germicides; glue and wood preservative; antimildew agent	111, 12, 3511, 3512, 3529, 354
Trifluralin	20		X		(X)		Pre-emergence herbicides	111, 3512
Trihalomethanes ( <i>see bromoform, dibromochloromethane, bromodichloromethane, chloroform</i> )								
Uranium <sup>e</sup>	15	X			(X)		Fuel in nuclear power stations	23, 372, 4101
Vinyl chloride <sup>3</sup>	0.3				X	(X)	Production of polyvinyl chloride (PVC); co-monomer with ethenyl ethanoate or 1,1-dichloroethene; raw material in the manufacture of 1,1,1-trichloroethane and monochloraldehyde	3511, 3513, 354
Xylenes <sup>c</sup>	500			(X)	X		Manufacture of insecticides and pharmaceuticals; component of detergents; solvent for paints, inks and adhesives; blending petrol; manufacture of various chemicals	111, 3511, 3512, 352, 353, 354, 38

- a Waste disposal and use of sewage sludges (classified in this publication as originating from human settlements) may result in the presence of chemicals from human settlements additional to those shown in this table.
- b Managed through product specification.
- c May cause problems with acceptability at concentrations below health-based guideline value.
- d Provisional guideline value — refer to the WHO *Guidelines for Drinking-water Quality* (WHO, 2004) for complete explanation of provisional guidelines
- e In some circumstances, treatment may be difficult at concentrations above the guideline value.
- f Health-based guideline value not proposed because not of health concern at levels found in drinking-water.
- X Primary source of chemical in drinking-water.
- (X) Secondary sources of chemical in drinking-water. Secondary sources must be taken into consideration as part of the assessment of priority chemicals.

**Table A1.2 Chemicals that may give rise to consumer complaints**

Chemical	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
	Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Aluminium					X	Antacids; antiperspirants; food additives; vaccine adjuvants; flocculants	23, 311/2, 3522, 372, 38,4
Ammonia	(X)	X		X	X	Fertilizer and animal feed production; manufacture of fibre, plastics, explosives, paper and rubber; coolant; metal processing; starting production for many nitrogen-containing compounds; cleaning agents; food additive; diuretic	311/2, 3210, 341, 351, 3523, 3529, 355, 38
Chloride	X		X	X		Production of industrial chemicals such as caustic soda, chlorine, sodium chlorite and sodium hypochlorite; snow and ice control; production of fertilizers	3121, 3511, 3512
Chlorine					X	See Table A1.1	
2-chlorophenol				(X)	(X)	See Table A1.1	
Copper	(X)			(X)	X	See Table A1.1	
1,2-dichlorobenzene				X		See Table A1.1	
1,4-dichlorobenzene				X		See Table A1.1	
2,4-dichlorophenol				(X)	(X)	See Table A1.1	
Ethylbenzene			(X)	X		See Table A1.1	
Hydrogen sulfide	X					Conversion into sulfur; sulfuric acid manufacture; dye manufacture; tanning; production of wood-pulp; chemical processing; manufacture of cosmetics	3231, 341, 3511, 3529,354

Chemical	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
	Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Chemical	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
Chemical	Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution	Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
Iron	X				X	Drinking-water pipes; pigments in paints and plastics; food colours; treatment of iron deficiency in humans; coagulants	23, 3513, 3522, 3529, 371, 38,4, 932
Manganese	X					See Table A1.1	
Monochloramine					X	Drinking water treatment for residual disinfection.	
Monochlorobenzene				X		See Table A1.1	
Sodium	X			X		Manufacture of tetraethyl lead and sodium hydride; titanium production; catalytic?? synthetic rubber; laboratory reagent; coolant in nuclear reactors; electric power cables; non-glare lighting for roads; solar-powered electric generators; water treatment	3511, 3529, 355, 362, 372, 38, 4
Styrene			(X)	X		See Table A1.1	

Chemical	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
	Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Sulfate	X			X		Fertilizers; chemicals; dyes; glass; paper; soaps; textiles; fungicides; insecticides; astringents; emetic; mining, wood-pulp, metal and plating industry; sewage treatment; leather processing; sedimentation agent; control of algae	111, 2, 3231, 341, 3511, 3512, 3523, 3529, 362, 37, 38, 4
Synthetic detergents			X	X		Cleaning and washing	(all industries)
Toluene			(X)	X		See Table A1.1	
Trichlorobenzenes (tot)				X		See Table A1.1	
Trichlorophenol (2,4,6-)				(X)	(X)	See Table A1.1	
Xylene			(X)	X		See Table A1.1	
Chemical	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
	Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		

Chemical	Origin					Major use(s)	Potential source (UN industry/process code numbers, as shown in Appendix 3)
	Naturally occurring	Agricultural activities	Human settlements <sup>a</sup>	Industries	Production and distribution		
Zinc	X			X	X	Corrosion-resistant alloys; brass; galvanizing steel; iron products; rubber; treatment of zinc deficiency in humans; pesticides	111, 23, 3512, 3522, 355, 372, 38, 932

a Waste disposal and use of sewage sludges (classified in this publication as originating from human settlements) may result in the presence of chemicals from human settlements additional to those shown in this table.

X Primary source of chemical in drinking-water.

(X) Secondary source of chemical in drinking-water

## References

WHO (2004). *Guidelines for drinking-water quality*, 3rd ed., World Health Organization, Geneva.