

## Chinese\*, Canadian, Australian\*\* and Japanese Fertilizer Metal Standard Summary

METAL	CHINA*	CANADA		AUSTRALIA**									JAPAN	
		mg/kg Fertilizer	kg/ha Max. Acceptable Cumulative Additions to Soil over 45 years	mg/kg dw Maximum Acceptable Metal Conc.	mg/kg P Phosphorous fertilizers	mg/kg product Non-phosphorous fertilizers	mg/kg product Fertilizers wholly constituted by micro-nutrients	mg/kg product Phospho-gypsum	mg/kg All fertilizers and micro-nutrients	mg/kg Major nutrient fertilizers & soil ameliorants	mg/kg Major nutrient fertilizer with micro-nutrients	mg/kg Micro-nutrient foliar app.		mg/kg Micro-nutrient for soil app.
<b>Arsenic</b>	50	15	75	-	-	-	-	-	-	-	-	-	-	50
<b>Cadmium</b>	8	4	20	300	10	50	15	-	-	-	-	-	-	8
<b>Cobalt</b>	-	30	150	-	-	-	-	-	-	-	-	-	-	-
<b>Mercury</b>	5	1	5	-	-	-	-	5	-	-	-	-	-	5
<b>Molybdenum</b>	-	4	20	-	-	-	-	-	-	-	-	-	-	-
<b>Nickel</b>	-	36	180	-	-	-	-	-	-	-	-	-	-	-
<b>Lead</b>	100	100	500	-	-	-	-	-	100	500	500	2000	100	
<b>Selenium</b>	-	2.8	14	-	-	-	-	-	-	-	-	-	-	-
<b>Zinc</b>	-	370	1850	-	-	-	-	-	-	-	-	-	-	-
<b>Chromium</b>	500	-	-	-	-	-	-	-	-	-	-	-	-	500

\* China proposed standards to take effect in the spring of 2003, but as of 2/04 has not yet implemented them.

\*\* Australian States have agreed to move to a single national standard. The National Standards listed here have been proposed by Fertilizer Industry Federation of Australia, Inc.

### Selected European Fertilizer Cadmium Level Standards

COUNTRY	Cd In Fertilizers (mg/kg P2O5)	Cd Input to Agricultural Soil (g/ha/a)	Cd in Agricultural Soils (mg/kg dry soil)
<b>Austria</b>	75	10 <sup>(1)</sup> / 5 <sup>(2)</sup>	1.0
<b>Belgium/Luxembourg</b>	90	150	1.0-3.0
<b>Denmark</b>	47		0.5
<b>Finland</b>	21.5	3	0.5
<b>Germany</b>	40-90 <sup>(7)</sup>	16.7 <sup>(3)</sup>	1.0
<b>Netherlands</b>	(8)		0.5-1.0
<b>Portugal</b>	40-70 <sup>(9)</sup>		
<b>Sweden</b>	43 <sup>(10)</sup>	1.75 <sup>(4)</sup>	
<b>United Kingdom</b>		0.15 <sup>(5)</sup>	3.0 <sup>(6)</sup>
<b>The European Union</b> has adopted the following phased in EU-wide limit on cadmium concentrations in fertilizers: 60 mg Cd/kg P2O5 by 2006, 40 mg Cd/kg P2O5 by 2010, 20 mg Cd/kg P2O5 by 2015			

(1) airable land, (2) grassland and vegetables, (3) average over a period of 3 years, (4) average for 7 years; will lower to 0.75 g ha-1 year – 1 as from 2000, (5) with sewage sludge only, (6) soils with a pH of 5 and above, treated with sewage sludge, (7) based on a voluntary agreement between government and industry, (8) OECD (1994) mentions a limit of 40 mg/kg phosphorous (17 mg / kg P2O5). According to a spokesman of VKP, there is no limit for the Cd content in P fertilizers in the Netherlands. Instead a voluntary agreement is in preparation, (9) mentioned in OECD (1994); probably not a legal limit, (10) a voluntary limit of 21.5 mg/kg P2O5 has been introduced by the SLR.

Source: Hutton, M. and C. de Meeus, for and behalf of Environmental Resources Management, Analysis and Conclusions from Member States' Assessment of the Risk to Health and the Environment from Cadmium in Fertilisers, October 2001.

**European Council Directive 86/278/EEC Sewage Sludge Metal Level Standards**

<b>METAL</b>	<b>Limit Values for Concentrations of Heavy Metals in Soil (Soil with pH of 6-7) mg/kg</b>	<b>Limit Values for Heavy-Metal Concentrations in Sludge for Use in Agriculture mg/kg</b>	<b>Limit Values for Amounts of Heavy Metals which may be Added Annually to Agricultural Land (Based on 10-Year Avg.) kg/ha/yr</b>
<b>Cadmium</b>	1 to 3	20 to 40	0.15
<b>Copper</b>	50 to 140	1000 to 1750	12
<b>Nickel</b>	30 to 75	300 to 400	3
<b>Lead</b>	50 to 300	750 to 1200	15
<b>Zinc</b>	150 to 300	2500 to 4000	30
<b>Mercury</b>	1 to 1.5	16 to 25	0.1
<b>Chromium</b>	100 to 150	1000 to 1500	4

### Comparison of Selected U.S. Biosolid Metal Level Standards

METAL	EPA				ME			
	Ceiling Concentration mg/kg	Cumulative Loading Rates kg/ha	Monthly Average Conc. mg/kg	Annual Loading Rates kg/ha	Ceiling Concentration in Sludge mg/kg	Cumulative Loading Rate kg/ha	Ceiling Concentration in soil mg/kg	Annual Loading Rate kg/ha
Aluminum	-	-	-	-	-	-	100,000	-
Arsenic	75	41	41	2.0	41	10	73	0.5
Barium	-	-	-	-	-	-	1500	-
Beryllium	-	-	-	-	-	-	7	-
Cadmium	85	39	39	1.9	39	39	39	1.9
Chromium	-	-	-	-	3000	-	3000	-
Cobalt	-	-	-	-	-	-	70	-
Copper	4300	1500	1500	75	1500	1500	1500	75
Lead	840	300	300	15	300	300	300	15
Mercury	57	17	17	0.85	10	6	6	0.3
Molybdenum	75	-	-	-	75	-	15	-
Nickel	420	420	420	21	420	420	420	20
Selenium	100	100	100	5.0	100	100	100	5
Silver	-	-	-	-	-	-	34	-
Vanadium	-	-	-	-	-	-	300	-
Zinc	7500	2800	2800	140	2800	2800	2800	140

METAL	NY				VA	
	Land Application: Monthly Avg Conc. ppm	Land Application: Max Conc. ppm	Product: Monthly Avg. Conc. ppm	Product: Max Conc. ppm	Max Conc in Product for Land App. mg/kg	Cumulative Loading Rate kg/ha
Arsenic	41	75	41	75	41	41
Cadmium	21	85	10	85	21	21
Chromium	1000	1000	1000	1000	1200	3000
Copper	1500	3000	1500	3000	1500	1500
Lead	300	840	300	840	300	300
Mercury	10	57	10	57	17	17
Molybdenum	54	75	54	75	41	41
Nickel	200	420	200	420	420	420
Selenium	28	100	28	100	32	32
Zinc	2500	7500	2500	7500	2800	2800