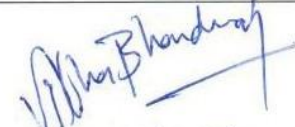




# **ENVIRONMENTAL STANDARDS AND ALLOWABLE LIMITS**

**AS PER FORMAT NUMBER**

**EPDA/ES/LIMIT-001**



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## Purpose

The objective is to recommend relevant and appropriate ambient water (Tank, Drinking, Industrial effluent Sewage, ground etc.), soil, pesticide, sediment quality specifications to be considered as limits based on best international practices for the long-term protection of environmental life and human health, and

Taking into consideration that all the limits are incorporated from international references and set as Environmental protection and development Authority Limit. The specifications recommend ambient water quality limits for eutrophic indicators, organic chemicals, trace metals, and microbiological parameters; and ambient sediment quality

Limits for organic chemicals and trace metals. EPDA will consider recommending limits for nutrients, trace and heavy metals, pesticide, microbiology, in the future and once reliable data are collected.

The proposed specifications Limits recommend used that aims to protect the high water quality as well as a "General Use" to maintain Free and safe environment quality at Ras al khaima

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## **Abbreviations and Acronyms**

**ADNOC** :- Abu Dhabi National Oil Company

**ADS** :- Abu Dhabi Specifications

**EAD** :- Environment Agency-Abu Dhabi

**ESMA** :- Emirates Authority for Standardization and Metrology

**ISO** :- International Organization for Standardization

**EPA** :- Environment protection agency United state

**FAO** :- Food and Agricultural Organization United nations

**WHO** :- World Health Organization

**NCBI** :- National Center of Biotechnology information

## Limits for Drinking water/Tank water

Testing parameter	Limits (mg/L)	Reference for Limit
<b>Metals</b>		
Aluminum (Al)	0.2	WHO <sup>(2)</sup>
Arsenic (As)	0.05	EPA <sup>(1)</sup>
Antimony (Sb)	0.006	EPA <sup>(1)</sup>
Barium (Ba)	2.0	EPA <sup>(1)</sup>
Beryllium (Be)	0.004	EPA <sup>(1)</sup>
Cadmium (Cd)	0.005	EPA <sup>(1)</sup>
Chromium (Cr)	0.1	EPA <sup>(1)</sup>
Copper (Cu)	1.3	EPA <sup>(1)</sup>
Iron (Fe)	0.2	EPA <sup>(1)</sup>
Lead (Pb)	0.015	EPA <sup>(1)</sup>
Manganese (Mn)	0.05	EPA <sup>(1)</sup>
Mercury (Hg)	0.002	EPA <sup>(1)</sup>
Nickel (Ni)	0.1	EPA <sup>(1)</sup>
Selenium (Se)	0.05	EPA <sup>(1)</sup>
Silver (Ag)	0.1	EPA <sup>(1)</sup>
Thallium (Tl)	0.002	EPA <sup>(1)</sup>
Zinc (Zn)	0.02	EPA <sup>(1)</sup>
Cobalt (Co)	2.00	EPA <sup>(1)</sup>
Chlorine (Cl)	4.00	EPA <sup>(1)</sup> , WHO <sup>(2)</sup>
Fluorine (F)	-	-
Lithium (Li)	0.70	EPA <sup>(1)</sup>
Magnesium(Mg)	25-50	EPA <sup>(1)</sup>
Molybdenum (Mb)	0.01	EPA <sup>(1)</sup>
Phosphorous(p)	2.2	EPA <sup>(1)</sup>
Sulphur(S)	<1.0	EPA <sup>(1)</sup>
Bromine (Br)	<0.01	EPA <sup>(1)</sup>
Tellurium (Te)	-	
Tin (Sn)	0.01	WHO <sup>(2)</sup>
Gallium (Ga)	-	-
Indium(In)	-	-
Thulium(Tl)	-	-
Gold(AU)	-	-
Palladium(PL)	-	-

Platinum (pt)	-	-
Calcium (Ca)	1-135	EPA <sup>(1)</sup>
Strontium(Sr)	4.0	EPA <sup>(1)</sup>
Sodium (Na)	20	EPA <sup>(1)</sup>
Potassium(K)	-	
<b>Physical parameter</b>		
Color	15.0 mg/l pt/Co scale	EPA <sup>(1)</sup>
Turbidity	0 NTU (Turbidity Unit)	EPA <sup>(1)</sup>
Total dissolved solids (TDS) (i) *	100-1,000 mg/L	EPA <sup>(1)</sup>
Total hardness *as CaCO <sub>3</sub>	NMT mg/L300 at 25 °C	EPA <sup>(1)</sup>
pH	7.0-9.2	EPA <sup>(1)</sup>
Salinity	0.1	EPA <sup>(1)</sup>
Oil Analysis	Nil	EPA <sup>(1)</sup>
Residual chlorine (ii)	0.2-0.5 mg/l	EPA <sup>(1)</sup>
<b>Volatile Organic Compound</b>		
Diethyl ether (ethyl ether)	Nil	EPA <sup>(1)</sup>
1,1,2-Trichlorotrifluoroethane	Nil	EPA <sup>(1)</sup>
1,1-dichloroethene	Nil	EPA <sup>(1)</sup>
Acetonitrile	Nil	EPA <sup>(1)</sup>
Iodomethane (methyl iodide)	Nil	EPA <sup>(1)</sup>
Allyl chloride ( 3-chloropropene )	Nil	EPA <sup>(1)</sup>
Methylene chloride (dichloromethane)	Nil	EPA <sup>(1)</sup>
Allyl chloride ( 3-chloropropene	Nil	EPA <sup>(1)</sup>
Carbon disulfide	Nil	EPA <sup>(1)</sup>
Acrylonitrile	Nil	EPA <sup>(1)</sup>
trans-1,2-Dichloroethene	Nil	EPA <sup>(1)</sup>
1,1-Dichloroethane	Nil	EPA <sup>(1)</sup>
Chloroprene (2-chloro-1,3-butadiene)	Nil	EPA <sup>(1)</sup>
Propionitrile	Nil	EPA <sup>(1)</sup>
2,2-Dichloropropane	Nil	EPA <sup>(1)</sup>
cis-1,2-Dichloroethene	Nil	EPA <sup>(1)</sup>
Methacrylonitrile	Nil	EPA <sup>(1)</sup>
Methyl acrylate	Nil	EPA <sup>(1)</sup>
Isobutanol (2-Methyl-1-propanol)	Nil	EPA <sup>(1)</sup>



chloroform	Nil	EPA <sup>(1)</sup>
Bromochloromethane	Nil	EPA <sup>(1)</sup>
Tetrahydrofuran	Nil	EPA <sup>(1)</sup>
1,1,1-trichloroethane	Nil	EPA <sup>(1)</sup>
1,1-Dichloropropene	Nil	EPA <sup>(1)</sup>
carbon tetrachloride	Nil	EPA <sup>(1)</sup>
1,2-Dichloroethane	Nil	EPA <sup>(1)</sup>
Benzene	Nil	EPA <sup>(1)</sup>
2-Chloroethanol	Nil	EPA <sup>(1)</sup>
Trichloroethene	Nil	EPA <sup>(1)</sup>
1,2-Dichloropropane	Nil	EPA <sup>(1)</sup>
Methyl methacrylate	Nil	EPA <sup>(1)</sup>
bromodichloromethane	Nil	EPA <sup>(1)</sup>
1,4-Dioxane	Nil	EPA <sup>(1)</sup>
Dibromomethane	Nil	EPA <sup>(1)</sup>
2-Nitropropane	Nil	EPA <sup>(1)</sup>
cis-1,3-Dichloropropene	Nil	EPA <sup>(1)</sup>
Toluene	Nil	EPA <sup>(1)</sup>
Ethyl methacrylate	Nil	EPA <sup>(1)</sup>
trans-1,3-Dichloropropene	Nil	EPA <sup>(1)</sup>
1,1,2-Trichloroethane	Nil	EPA <sup>(1)</sup>
1,3-Dichloropropane	Nil	EPA <sup>(1)</sup>
Tetrachloroethene	Nil	EPA <sup>(1)</sup>
dibromochloromethane	Nil	EPA <sup>(1)</sup>
1,2-Dibromoethane (EDB)	Nil	EPA <sup>(1)</sup>
Chlorobenzene	Nil	EPA <sup>(1)</sup>
1,1,1,2-Tetrachloroethane	Nil	EPA <sup>(1)</sup>
Ethylbenzene	Nil	EPA <sup>(1)</sup>
m-Xylene	Nil	EPA <sup>(1)</sup>
p-Xylene	Nil	EPA <sup>(1)</sup>
o-Xylene	Nil	EPA <sup>(1)</sup>
Styrene	Nil	EPA <sup>(1)</sup>
Isopropylbenzene (cumene)	Nil	EPA <sup>(1)</sup>
bromoform	Nil	EPA <sup>(1)</sup>
cis-1,4-Dichloro-2-butene	Nil	EPA <sup>(1)</sup>
1,1,2,2-Tetrachloroethane	Nil	EPA <sup>(1)</sup>
1,2,3-Trichloropropane	Nil	EPA <sup>(1)</sup>

trans-1,4-dichloro-2-butene	Nil	EPA <sup>(1)</sup>
n-Propylbenzene	Nil	EPA <sup>(1)</sup>
Bromobenzene	Nil	EPA <sup>(1)</sup>
1,3,5-Trimethylbenzene	Nil	EPA <sup>(1)</sup>
2-Chlorotoluene	Nil	EPA <sup>(1)</sup>
4-Chlorotoluene	Nil	EPA <sup>(1)</sup>
tert-Butylbenzene	Nil	EPA <sup>(1)</sup>
1,2,4-Trimethylbenzene	Nil	EPA <sup>(1)</sup>
sec-Butylbenzene	Nil	EPA <sup>(1)</sup>
p-Isopropyltoluene (p-Cymene)	Nil	EPA <sup>(1)</sup>
1,3-Dichlorobenzene	Nil	EPA <sup>(1)</sup>
p-Isopropyltoluene (p-Cymene)	Nil	EPA <sup>(1)</sup>
1,3-Dichlorobenzene	Nil	EPA <sup>(1)</sup>
1,4-Dichlorobenzene	Nil	EPA <sup>(1)</sup>
n-Butylbenzene	Nil	EPA <sup>(1)</sup>
1,2-Dichlorobenzene	Nil	EPA <sup>(1)</sup>
1,2-Dibromo-3-chloropropane	Nil	EPA <sup>(1)</sup>
Nitrobenzene	Nil	EPA <sup>(1)</sup>
1,2,4-Trichlorobenzene	Nil	EPA <sup>(1)</sup>
Hexachlorobutadiene	Nil	EPA <sup>(1)</sup>
Naphthalene	Nil	EPA <sup>(1)</sup>
1,2,3-Trichlorobenzene	Nil	EPA <sup>(1)</sup>
Fluorobenzene	Nil	EPA <sup>(1)</sup>
Chlorobenzene-d5	Nil	EPA <sup>(1)</sup>
1,4-Dichlorobenzene-d4	Nil	EPA <sup>(1)</sup>
Dibromofluoromethane	Nil	EPA <sup>(1)</sup>
Dibromofluoromethane	Nil	EPA <sup>(1)</sup>

(Note- Nil- "Zero" or "Nothing")

#### References

- 1) MCL-Maximum Contaminant Level for drinking water from a public water supply system. From "Current Drinking Water Standards", E.P.A. Office of Water.  
[https://www.freedrinkingwater.com/water\\_quality/chemical/water](https://www.freedrinkingwater.com/water_quality/chemical/water)
- 2) [http://www.who.int/water\\_sanitation\\_health/dwq/chemicals/](http://www.who.int/water_sanitation_health/dwq/chemicals/)

## Limits for Marine Water

Testing parameter	Limits (µg/L)	Reference for Limit
<b>Cadmium (Cd)</b>	< 0.7 µg/L	ADS <sup>(1)</sup>
<b>Chromium (Cr)</b>	< 0.2 µg/L	ADS <sup>(1)</sup>
<b>Copper (Cu)</b>	< 0.3 µg/L	ADS <sup>(1)</sup>
<b>Lead (Pb)</b>	< 2.2 µg/L	ADS <sup>(1)</sup>
<b>Mercury (Hg)</b>	< 0.1 µg/L	ADS <sup>(1)</sup>
<b>Nickel (Ni)</b>	< 7.0 µg/L	ADS <sup>(1)</sup>
<b>Zinc (Zn)</b>	< 15.0 µg/L	ADS <sup>(1)</sup>
<b>Dissolve Oxygen(DO)</b>	< 4.0 mg/l	ADS <sup>(1)</sup>
<b>Salinity</b>	-	-
<b>Oil Content</b>	For information	ADS <sup>(1)</sup>
<b>Nltrate</b>	20 mg/meter <sup>3</sup>	UK <sup>(2)</sup>
<b>Phospahte</b>	-	-
<b>Sulphate</b>	-	-
<b>Turbidity</b>	-	-

## Limits for Marine Sediment

Testing parameter	Limits (mg/kg)	Reference for Limit
Arsenic (As)	7.0	ADS <sup>(1)</sup>
Cadmium (Cd)	0.7	ADS <sup>(1)</sup>
Chromium (Cr)	52	ADS <sup>(1)</sup>
Copper(Cu)	20.0	ADS <sup>(1)</sup>
Lead (Pb)	30.0	ADS <sup>(1)</sup>
Mercury(Hg)	0.2	ADS <sup>(1)</sup>
Nickel (Ni)	16.0	ADS <sup>(1)</sup>
Zinc (Zn)	125.0	ADS <sup>(1)</sup>
Aluminum (Al)	-	-
Antimony (Sb)	-	-
Barium (Ba)	-	-
Beryllium (Be)	-	-
Iron (Fe)	-	-
Manganese (Mn)	-	-
Selenium (Se)	-	-
Silver (Ag)	-	-
Thallium (Tl)	-	-
Cobalt (Co)	-	-
Chlorine (Cl)	-	-
Fluorine (F)	-	-
Lithium (Li)	-	-
Magnesium(Mg)	-	-
Molybdenum (Mb)	-	-
Phosphorous(p)	-	-
Sulphur(S)	-	-
Bromine (Br)	-	-
Tellurium (Te)	-	-
Tin (Sn)	-	-

Gallium (Ga)	-	-
Indium(In)	-	-
Thulium(Tl)	-	-
Gold(AU)	-	-
Palladium(PL)	-	-
Platinum (pt)	-	-
Calcium (Ca)	-	-
Strontium(Sr)	-	-
Sodium (Na)	-	-
Potassium(K)	-	-

### References

- 1) ADS 2018/17 Abudhabi Specification
- 2) <http://plymseas.ac.uk/714>

## LIMITS FOR INDUSTRIAL SEWAGE, BUILDING SEWAGE

	Facility available at laboratory, need to purchase only related standards, and required accessories
	Facility available at laboratory need to purchase small reactor and reagent kit
	Facility not available at laboratory need to update the lab with this facility

Applicable scope	Testing Parameter	Effluent limits mg/L	Reference
Generally applicable parameter to wastewater from industries, sewage systems and sewage treatment facilities attached to buildings	pH	6.0–9.0	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Fluorides	15 mg/L	
	Oil content	10 mg/L	
	Nitrate nitrogen	50 mg/L	
	Ammonia nitrogen	10 mg/L	
	Orthophosphates	4.0 mg/L	
	Phenols	1.0 mg/L	
	Cyanide	1.0 mg/L	
	Oil and grease	10 mg/L	
	iron	10 mg/L	
	manganese	10 mg/L	
	Cadmium	0.03 mg/L	
	Lead	1.0 mg/L	
	Total chromium	2.0 mg/L	
	Total mercury	0.005 mg/L	
	Copper	3.0 mg/L	
	Zinc	5.0 mg/L	
	Silver	0.5 mg/L	
	Nickel	1.0 mg/L	
	Selenium	0.5 mg/L	
	Arsenic	0.5 mg/L	
	Boron	1.0 mg/L	
	Sulfide	1.0 mg/L	
	Formaldehyde	3.0 mg/L	
	PCBs	0.00005 mg/L	
	Total organophosphorous compounds (such as Parathion, Diazinon, Tamaron, Azodrin, EPN, etc.)	0.5 mg/L	
Total aminomethyl-carbamate (such as Mipcin, Carbofuran, Lannate, Unden, BPMC,	0.5 mg/L		

	etc.)		
	Herbicides (such as Butachlor, Paraquat, 2,4-D (sodium), Lasso, CNP-MCPA, Glyphosate, etc.)	1.0 µg/L	
	Endosulfan	0.03 mg/L	
	Endrin	0.0002 mg/L	
	Lindane	0.004 mg/L	
	Heptachlor and its derivatives	0.001 mg/L	
	DDT and its derivatives	0.001 mg/L	
	Aldrin, Dieldrin	0.003 mg/L	
	Pentachlorophenol and its salts	0.005 mg/L	
	Toxaphene	0.005 mg/L	
	Pentachloronitrobenzene	0.00005 mg/L	
	Folpet (phaltan)	0.00025 mg/L	
	Captafol	0.00025 mg/L	
	Captan	0.00025 mg/L	
Printing, dyeing, and finishing industry	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	160 mg/L	
	Suspended solids	30	
	True color	550 pt/co colour unit	
Cone dyeing, hank dyeing and knit and unwoven textile dyeing and finishing	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	140 mg/L	
	Suspended solids	30	
	True color	550 pt/co colour unit	
Finishing, paper printing, wool brushing, wool cutting, wool buffing, and others not belonging to the above two categories	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
	True color	550 pt/co colour unit	
Finished leather made from raw hide	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	160 mg/L	

	Suspended solids	30	
	True color	550 pt/co colour unit	
Finished leather made from wet blue	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	200 mg/L	
	Suspended solids	30	
	True color	550 pt/co colour unit	
Others not belonging to the categories finished leather made from raw hide and finished leather made from wet blue	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
	True color	550 pt/co colour unit	
Pulp industry	Chemical oxygen demand (COD)	150 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	50	
	True color	550 pt/co colour unit	
Fermentation industries MSG production industry; wine or liquor, alcohol and vinegar production industries; soy sauce	Biological oxygen demand (BOD)	50 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	150 mg/L	
	Suspended solids	50	
Paper manufacturing industry	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
	True color	550 pt/co colour unit	
Wool production and chemical industries	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	



Pharmaceutical and pesticide manufacturing industries	Suspended solids	30	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	True color	550	
	Biological oxygen demand (BOD)	30 mg/L	
Food industry	Chemical oxygen demand (COD)	100 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	30	
	True color	550 pt/co colour unit	
	Biological oxygen demand (BOD)	30 mg/L	
	E. Coli	200 CFU/100 mL	
Meat industry processing	Biological oxygen demand (BOD)	80 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	150 mg/L	
	Suspended solids	80	
	True color	550 pt/co colour unit	
	E. Coli	200 CFU/100 mL	
Metal, metal surface treatment, electroplating, manufacturing and repair, ship and wafer manufacturing, and semiconductor manufacturing industries	Chemical oxygen demand (COD)	100 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	30	
Power plants	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Total residual chlorine	0.5	
Rubber manufacturing industry	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
Cement manufacturing industry	Chemical oxygen demand (COD)	100 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	50	
Powder manufacturing industry	Biological oxygen demand (BOD)	50 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen	100 mg/L	

	demand (COD)		
	Suspended solids	80	
Textile industry	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
	True color	550 pt/co colour unit	
Sugar industry	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
Mineral extraction, ceramic, and soil or rock processing and extraction industries	Chemical oxygen demand (COD)	100 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	50	
Automobile repair facilities	Chemical oxygen demand (COD)	100 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	30	
Glass industry	Chemical oxygen demand (COD)	100 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	50	
Other industries	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
	True color	550	
Wastewater treatment service industry	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
	True color	550 pt/co colour unit	
	E. Coli	300 CFU/100 mL	
Meat markets	Biological oxygen demand (BOD)	80 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,</sup>

	Chemical oxygen demand (COD)	150 mg/L	9,10,11)
Fish Market	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
Recyclable waste recycling industry and sanitary landfills	Chemical oxygen demand (COD)	300 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	50	
Waste incinerators and other waste treatment plants (facilities)	Chemical oxygen demand (COD)	100 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	30	
	E. Coli	200 CFU/100 mL	
Laundry industry, shipbreaking industry, ship cleaning industry	Chemical oxygen demand (COD)	100 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	50	
Aquaculture industry	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
Experimental, (chemical) testing and research laboratories	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	200 mg/L	
	Suspended solids	50	
Hospitals and medical institutions	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	
	Suspended solids	30	
	E. Coli	200 CFU/100 mL	
Environmental inspection and testing organizations	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	100 mg/L	

	Suspended solids	30	
Tap-water plants	Chemical oxygen demand (COD)	100 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	50	
	Total residual chlorine	0.5	
Restaurants, hotels and recreational resorts	Biological oxygen demand (BOD)	50 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Chemical oxygen demand (COD)	150 mg/L	
	Suspended solids	50	
	E. Coli	300 CFU/100 mL	
Car-washes	Chemical oxygen demand (COD)	100	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	Suspended solids	50	
Sewage system for Non industrial park	Biological oxygen demand (BOD)	30 mg/L	EPA <sup>(1,2,3,4,5,6,7,8,9,10,11)</sup>
	demand (COD)	100 mg/L	
	Suspended solids	30	
	True color	550 pt/co colour unit	

## References

1. Original 4 articles promulgated by Department of Health Order Wei-Shu-Huan-Tzu No. 654798 on May 5, 1987. Revisions promulgated by EPA Order (80) Huan-Shu-Fa-Tzu No. 00359 on January 16, 1991.
2. Revisions promulgated by EPA Order (80) Huan-Shu-Fa-Tzu No. 46873 on November 29, 1991.
3. Revisions promulgated by EPA Order (86) Huan-Shu-Shui-Tzu No. 09953 on March 19, 1997.
4. Revisions promulgated by EPA Order (86) Huan-Shu-Shui-Tzu No. 78804 on December 24, 1997.
5. Revisions to Article 6 promulgated by EPA Order (88) Huan-Shu-Shui-Tzu No. 0060545 on September 22, 1999. Revisions to original eight articles promulgated by EPA Order (89) Huan-Shu-Shui-Tzu No. 0004191 on February 9, 2000.
6. Revisions to Articles 2 and 6 promulgated by EPA Order (90) Huan-Shu-Shui-Tzu No. 0004055 on February 7, 2001.
7. Revisions to Article 2 promulgated by EPA Order (90) Huan-Shu-Shui-Tzu No. 0069097 on November 21, 2001. Revisions to Article 2 promulgated by EPA Order Huan-Shu-Shui-Tzu No. 09200847 on November 26, 2003.
8. Revisions to original eight articles promulgated by EPA Order Huan-Shu-Shui-Tzu No. 0960065740 on September 3, 2007.
9. Revisions to Articles 2 and 6 promulgated by EPA Order Huan-Shu-Shui-Tzu No. 0980065341 on July 28, 2009. Nine articles promulgated by EPA Order Huan-Shu-Shui-Tze No. 0990112348F on December 15, 2010.
10. Revisions to Articles 2 promulgated by EPA Order Huan-Shu-Shui-Tzu No. 10000103860 on

December 1, 2011. Revisions to Articles 2,5 and 6 promulgated by EPA Order Huan-Shu-Shui-Tzu No. 1010090770 on October 12, 2012.

11. Revisions to Articles 2 promulgated by EPA Order Huan-Shu-Shui-Tzu No. 1030005842 on January 22, 2014.

## Ground water Limits

Testing parameter	Limits (mg/L)	Reference for Limit
<b>Metals</b>		
Aluminum (Al)	0.2-8.0 mg/L	WQA <sup>(2)</sup>
Arsenic (As)	0.10 mg/L	EPA <sup>(1)</sup>
Antimony (Sb)	0.1-0.2 µg/L	WHO <sup>(3)</sup>
Barium (Ba)	2.0 mg/L	EPA <sup>(1)</sup>
Beryllium (Be)	0.004 mg/L	EPA <sup>(1)</sup>
Cadmium (Cd)	0.005 mg/L	EPA <sup>(1)</sup>
Chromium (Cr)	0.1 mg/L	EPA <sup>(1)</sup>
Copper (Cu)	1.3 mg/L	EPA <sup>(1)</sup>
Iron (Fe)	2.0 mg/L	WHO <sup>(2)</sup>
Lead (Pb)	0.05 mg/L	EPA <sup>(1)</sup>
Manganese (Mn)	1.0 mg/L	EPA <sup>(1)</sup>
Mercury (Hg)	0.002 mg/L	EPA <sup>(1)</sup>
Nickel (Ni)	0.9 mg/L	WHO <sup>(3)</sup>
Selenium (Se)	0.05 mg/L	EPA <sup>(1)</sup>
Silver (Ag)	-	
Thallium (Tl)	1.3 mg/L	NCBI <sup>(4)</sup>
Zinc (Zn)	5.0 mg/L	WHO <sup>(2)</sup>
Cobalt (Co)		EPA <sup>(1)</sup>
Chlorine (Cl)	4.00 mg/L	EPA <sup>(1)</sup> , WHO <sup>(2)</sup>
Fluorine (F)	-	-
Lithium (Li)	0.15 mg/L	EPA <sup>(1)</sup>
Magnesium(Mg)	1-20 mg/L	EPA <sup>(1)</sup>
Molybdenum (Mb)	0.01 mg/L	EPA <sup>(1)</sup>
Phosphorous(p)	-	-
Sulphur(S)	-	-
Bromine (Br)	1.0 mg/L	WHO <sup>(2)</sup>
Tellurium (Te)	0.989 mg/L	EPA <sup>(1)</sup>
Tin (Sn)	-	-
Gallium (Ga)	-	-
Indium(In)	-	-
Thulium(Tl)	-	-
Gold(AU)	-	-
Palladium(PL)	-	-
Platinum (pt)	-	-

Calcium (Ca)	100 mg/L	EPA <sup>(1)</sup>
Strontium(Sr)	4.0 mg/L	EPA <sup>(1)</sup>
Sodium (Na)	-	-
Potassium(K)	-	-
<b>Physical parameter</b>		
Color	100.0 mg/l pt/Co scale	EPA <sup>(1)</sup>
Turbidity	10 NTU (Nephelometric Turbidity Unit)	EPA <sup>(1)</sup>
Total dissolved solids (TDS) (i) *	100 mg/L(minimum) 1,000 mg/L (maximum)	EPA <sup>(1)</sup>
Total hardness *as CaCO <sub>3</sub>	NMT mg/L300 at 25 °C	EPA <sup>(1)</sup>
pH	6.5-9.2	EPA <sup>(1)</sup>
conductivity	-	-
Salinity	-	-
Residual chlorine (ii)	0.2-0.5 mg/l	EPA <sup>(1)</sup>
Nitrate	50 mg/L	EPA <sup>(1)</sup>
Nitrite	0.5 mg/L	EPA <sup>(1)</sup>
COD	40 mg/L	EPA <sup>(1)</sup>
BOD	7	EPA <sup>(1)</sup>
Oil /grease content	2.0 mg/L	EPA <sup>(1)</sup>
Phosphates	0.7 mg/L	EPA <sup>(1)</sup>
Total phosphorous	10 mg/L	EPA <sup>(1)</sup>
<b>Pesticides/OCT/PCB/PCT</b>		
Acetochlor (34256-82-1)	0.0005 mg/L	EPA <sup>(1)</sup>
Aldrin (309-00-2)	0.0005 mg/L	EPA <sup>(1)</sup>
<i>cis</i> -Chlordane (5103-71-9)	0.0005 mg/L	EPA <sup>(1)</sup>
<i>trans</i> -Chlordane (5103-74-2)	0.0005 mg/L	EPA <sup>(1)</sup>
Chlorobenzilate (510-15-6)	0.0005 mg/L	EPA <sup>(1)</sup>
Chloroneb (2675-77-6)	0.0005 mg/L	EPA <sup>(1)</sup>
Chlorothalonil (1897-45-6)	0.0005 mg/L	EPA <sup>(1)</sup>
Dacthal (DCPA) (1861-32-1)	0.0005 mg/L	EPA <sup>(1)</sup>
4,4'-DDD (72-54-8)	0.0005 mg/L	EPA <sup>(1)</sup>
4,4'-DDE (72-55-9)	0.0005 mg/L	EPA <sup>(1)</sup>
4,4'-DDT (50-29-3)	0.0005 mg/L	EPA <sup>(1)</sup>
Dieldrin (60-57-1)	0.0005 mg/L	EPA <sup>(1)</sup>

Endosulfan I (959-98-8)	0.0005 mg/L	EPA <sup>(1)</sup>
Endosulfan II (33213-65-9)	0.0005 mg/L	EPA <sup>(1)</sup>
Endosulfan sulfate (1031-07-8)	0.0005 mg/L	EPA <sup>(1)</sup>
Endrin (72-20-8)	0.0005 mg/L	EPA <sup>(1)</sup>
$\alpha$ -HCH (319-84-6)	0.0005 mg/L	EPA <sup>(1)</sup>
$\beta$ -HCH (319-85-7)	0.0005 mg/L	EPA <sup>(1)</sup>
$\delta$ -HCH (319-86-8)	0.0005 mg/L	EPA <sup>(1)</sup>
$\gamma$ -HCH (Lindane) (58-89-9)	0.0005 mg/L	EPA <sup>(1)</sup>
Heptachlor (76-44-8)	0.0005 mg/L	EPA <sup>(1)</sup>
Heptachlor epoxide (1024-57-3)	0.0005 mg/L	EPA <sup>(1)</sup>
Hexachlorobenzene (118-74-1)	0.0005 mg/L	EPA <sup>(1)</sup>
Hexachlorocyclopentadiene (HCCPD) (77-47-4)	0.0005 mg/L	EPA <sup>(1)</sup>
Methoxychlor (72-43-5)	0.0005 mg/L	EPA <sup>(1)</sup>
<i>trans</i> -Nonachlor (39765-80-5)	0.0005 mg/L	EPA <sup>(1)</sup>
Pentachlorophenol (87-86-5)	0.0005 mg/L	EPA <sup>(1)</sup>
<i>cis</i> -Permethrin (61949-76-6)	0.0005 mg/L	EPA <sup>(1)</sup>
<i>trans</i> -Permethrin (61949-77-7)	0.0005 mg/L	EPA <sup>(1)</sup>

## References

- 1) [https://www.epa.ie/pubs/advice/water/quality/Water\\_Quality.pdf](https://www.epa.ie/pubs/advice/water/quality/Water_Quality.pdf)
- 2) <https://www.wqa.org/Portals/0/Technical>
- 3) [http://www.who.int/water\\_sanitation\\_health/dwq/chemicals/antimony.pdf](http://www.who.int/water_sanitation_health/dwq/chemicals/antimony.pdf)
- 4) <https://www.ncbi.nlm.nih.gov/pmc/articles/>



## STANDARD LIMIT FOR IRRIGATION WATER

Testing Parameter	Limits	References
Colour	100.0 mg/l pt/Co scale	EPA <sup>(1)</sup>
Turbidity	10 NTU (Nephelometric Turbidity Unit)	EPA <sup>(1)</sup>
Total dissolved solids TDS (mg/L)	0 -2000 mg/L	FAO <sup>(1)</sup>
Electrical conductivity EC <sub>w</sub> (dS/m)	0 – 3.0 dS/m	FAO <sup>(1)</sup>
Total hardness *as CaCO <sub>3</sub>	0.75 - 2.6 meq/l	University of Tansannse <sup>(2)</sup>
pH	6.5 – 8.4	FAO <sup>(1)</sup>
Salinity	-	
Oil/Grease content	2.0 mg/L	FAO <sup>(1)</sup>
Elemental chloride (me/l)	0 – 30 me/l	FAO <sup>(1)</sup>
<b>Metals</b>		
Aluminum (Al)	5.0 mg/L	FAO <sup>(3)</sup>
Arsenic (As)	0.1 mg/L	FAO <sup>(3)</sup>
Antimony (Sb)	-	-
Barium (Ba)	-	-
Beryllium (Be)	0.1 mg/L	FAO <sup>(3)</sup>
Cadmium (Cd)	0.01 mg/L	FAO <sup>(3)</sup>
Chromium (Cr)	0.1 mg/L	FAO <sup>(3)</sup>
Copper (Cu)	0.2 mg/L	FAO <sup>(3)</sup>
Iron (Fe)	5.0 mg/L	FAO <sup>(3)</sup>
Lead (Pb)	5.0 mg/L	FAO <sup>(3)</sup>
Manganese (Mn)	0.2 mg/L	FAO <sup>(3)</sup>
Mercury (Hg)	0.002 mg/L	FAO <sup>(3)</sup>
Nickel (Ni)	0.2 mg/L	FAO <sup>(3)</sup>
Selenium (Se)	0.02 mg/L	FAO <sup>(3)</sup>
Silver (Ag)	-	-
Thallium (Tl)	-	-
Zinc (Zn)	2.0 mg/L	FAO <sup>(3)</sup>
Cobalt (Co)	0.05 mg/L	FAO <sup>(3)</sup>
Chlorine (Cl)	-	-
Florine (F)	-	-

Lithium (Li)	2.5 mg/L	FAO <sup>(1)</sup>
Magnesium(Mg) (me/l)	5 mg/L	FAO <sup>(1)</sup>
Molybdenum (Mb)	0.01 mg/L	FAO <sup>(1)</sup>
Phosphorous(p)	3 mg/L	University of kentucky <sup>(5)</sup>
Sulphur(S) (me/l)	20 mg/L	FAO <sup>(1)</sup>
Bromine (Br)	-	-
Tellurium (Te)	-	-
Tin (Sn)	-	-
Gallium (Ga)	-	-
Indium(In)	-	-
Thulium(Tl)	-	-
Gold(AU)	-	-
Palladium(PL)	-	-
Platinum (pt)	-	-
Calcium (Ca)	80 – 130 mg/L	University of kentucky <sup>(4)</sup>
Strontium(Sr)	-	-
Sodium (Na) ((me/l))	40 mg/L	FAO <sup>(1)</sup>
Potassium(K)	2 mg/L	FAO <sup>(1)</sup>

**Irrigation water quality guidelines and standards for wastewater reuse in agriculture.**

Parameter	Limit	References
Coliform (/100 mL)	not detected	EPA <sup>(6)</sup>
Turbidity	<2	EPA <sup>(5)</sup>
BOD (mg/L)	<10	EPA <sup>(5)</sup>
Odor	Do not unpleasand	Ministry of Environment South Korea <sup>(7)</sup>
pH	6.0 – 9.0	EPA <sup>(5)</sup>
Salinity or EC (dS/m)	0 – 3.0 dS/m	FAO <sup>(8)</sup>
Total dissolved solids TDS (mg/L)	0 -2000 mg/L	FAO <sup>(7)</sup>

**Reference**

1. <http://www.fao.org/3/t0234e/T0234E01.htm#note2>
2. <https://extension.tennessee.edu/publications/Documents/pb1617.pdf>
3. <http://www.fao.org/3/t0234e/t0234e06.htm>
4. <http://www2.ca.uky.edu/agcomm/pubs/HO/HO111/HO111.pdf>
5. Guidelines for Water Reuse 600/R-12/618; Environmental Protection Agency: Washington, DC, USA, 2012.
6. Water Quality Standards for Treated Wastewater Based on Its Specific Purpose of Use; Ministry of Environment: Gyeonggi-do, QKorea, 2011.
7. <http://www.fao.org/3/t0551e/t0551e04.htm>
8. <http://www.fao.org/3/t0551e/t0551e04.htm>

## Limits for pesticide in Agriculture field

Pesticide Name	Type of plant Species	Limit of residue remain	Reference
Acetochlor (34256-82-1)	Beans, except broad bean and soya bean	0.02 mg/kg	FAO <sup>(1)</sup>
	Broad bean (dry)	0.15 mg/kg	
	Buckwheat	0.04 mg/kg	
	Buckwheat fodder	0.3 mg/kg	
	Chick-pea (dry)	0.15 mg/kg	
	Edible offal (mammalian)	0.02 mg/kg	
	Eggs	0.02 mg/kg	
	Hyacinth bean (dry)	0.15 mg/kg	
	Legume animal feeds	3 mg/kg	
	Lentil (dry)	0.15 mg/kg	
	Lupin (dry)	0.15 mg/kg	
	Maize	0.02 mg/kg	
	Mammalian fats (except milk fats)	0.02 mg/kg	
	Meat (from mammals other than marine mammals)	0.02 mg/kg	
	Milks	0.02 mg/kg	
	Millet (Including barnyard, bulrush, common, finger, foxtail and little millet)	0.04 mg/kg	
	Millet fodder, dry	0.3 mg/kg	
	Oat straw and fodder, dry	0.3 mg/kg	
	Oats	0.04 mg/kg	
	Peas (dry)	0.02 mg/kg	
	Pigeon pea (dry)	0.15 mg/kg	
	Potato	0.04 mg/kg	
	Poultry meat	0.02 mg/kg	
	Poultry, edible offal of	0.02 mg/kg	
	Rye	0.04 mg/kg	
	Rye straw and fodder, dry	0.3 mg/kg	
	Sugar beet	0.15 mg/kg	
	Sugar beet leaves or tops (dry)	3 mg/kg	
Sugar beet molasses	0.3 mg/kg		

	Sugar beet pulp, dry	0.3 mg/kg	
	Sunflower seed	0.04 mg/kg	
	Sweet corn (corn-on-the-cob)	0.04 mg/kg	
	Sweet corn fodder	1.5 mg/kg	
	Teosinte	0.04 mg/kg	
	Teosinte fodder	0.3 mg/kg	
	Triticale	0.04 mg/kg	
	Wheat	0.02 mg/kg	
	Wheat straw and fodder, dry	0.2 mg/kg	
Aldrin (309-00-2)	Cereal grains	0.02 mg/kg	FAO <sup>(1)</sup>
	Citrus fruits	0.05 mg/kg	
	Eggs	0.1 mg/kg	
	Fruiting vegetables, cucurbits	0.1 mg/kg	
	Garden pea, shelled (succulent seeds)	1 mg/kg	
	Leafy vegetables	0.05 mg/kg	
	Legume vegetables	0.05 mg/kg	
	Meat (from mammals other than marine mammals)	0.2 mg/kg	
	Milks	0.006 mg/kg	
	Pome fruits	0.05 mg/kg	
	Poultry meat	0.2 mg/kg	
	Pulses	0.05 mg/kg	
	Root and tuber vegetables	0.1 mg/kg	
<i>cis</i> -Chlordane (5103-71-9) <i>trans</i> -Chlordane (5103-74-2)	Cotton seed oil, crude	0.05 mg/kg	FAO <sup>(1)</sup>
	Eggs	0.02 mg/kg	
	Fruits and vegetables	0.02 mg/kg	
	Hazelnuts	0.02 mg/kg	
	Linseed oil, crude	0.05 mg/kg	
	Maize	0.02 mg/kg	

	Meat (from mammals other than marine mammals)	0.05 mg/kg	
	Milks	0.002 mg/kg	
	Oats	0.02 mg/kg	
	Pecan	0.02 mg/kg	
	Poultry meat	0.5 mg/kg	
	Rice, polished	0.02 mg/kg	
	Rye	0.02 mg/kg	
	Sorghum	0.02 mg/kg	
	Soya bean oil, crude	0.05 mg/kg	
	Soya bean oil, refined	0.02 mg/kg	
	Walnuts	0.02 mg/kg	
	Wheat	0.02 mg/kg	
Chlorobenzilate (510-15-6)	Apricot	2 mg/kg	FAO <sup>(1)</sup>
	Asparagus	0.2 mg/kg	
	Banana	0.2 mg/kg	
	Barley	0.5 mg/kg	
	Barley straw and fodder, dry	2 mg/kg	
	Beans (dry)	0.5 mg/kg	
	Berries and other small fruits	1 mg/kg	
	Brussels sprouts	0.5 mg/kg	
	Carrot	0.2 mg/kg	
	Cattle meat	0.05 mg/kg	
	Cherries	10 mg/kg	
	Chicken fat	0.05 mg/kg	
	Coffee beans	0.1 mg/kg	
	Common bean (pods and/or immature seeds)	0.5 mg/kg	
	Cucumber	0.05 mg/kg	
	Edible offal (mammalian)	0.05 mg/kg	
	Eggs	0.05 mg/kg	
	Garden pea, shelled (succulent seeds)	0.02 mg/kg	
	Gherkin	0.05 mg/kg	
	Grapes	3 mg/kg	
	Lettuce, head	5 mg/kg	
	Mango	5 mg/kg	
Milks	0.05 mg/kg		

	Nectarine	2 mg/kg	
	Oranges, sweet, sour (including Orange-like hybrids) (subgroup)	1 mg/kg	
	Peach	2 mg/kg	
	Peanut	0.1 mg/kg	
	Peanut fodder	3 mg/kg	
	Peppers chili	2 mg/kg	
	Peppers chili, dried	20 mg/kg	
	Pineapple	5 mg/kg	
	Plums (including fresh prunes)	0.5 mg/kg	
	Pome fruits	3 mg/kg	
	Poultry meat	0.05 mg/kg	
	Rape seed	0.05 mg/kg	
	Rice straw and fodder, dry	15 mg/kg	
	Rice, husked	2 mg/kg	
	Rye	0.1 mg/kg	
	Soya bean (dry)	0.5 mg/kg	
	Soya bean fodder	0.1 mg/kg	
	Spices, fruits and berries	0.1 mg/kg	
	Spices, roots and rhizomes	0.1 mg/kg	
	Squash, summer	0.5 mg/kg	
	Sugar beet	0.1 mg/kg	
	Tomato	0.5 mg/kg	
	Tree nuts	0.1 mg/kg	
	Wheat	0.05 mg/kg	
	Wheat straw and fodder, dry	1 mg/kg	
Chloroneb (2675-77-6)	Cattle, edible offal of	0.01 mg/kg	FAO <sup>(1)</sup>
	Milk fats	0.02 mg/kg	
	Milks	0.01 mg/kg	
	Potato	30 mg/kg	
Chlorothalonil (1897-45-6)	Banana	15 mg/kg	FAO <sup>(1)</sup>
	Brussels sprouts	6 mg/kg	

Celery	20 mg/kg
Chard	50 mg/kg
Cherries	3 mg/kg
Cranberry	5 mg/kg
Cucumber	3 mg/kg
Currants, black, red, white	20 mg/kg
Edible offal (mammalian)	0.2 mg/kg
Flowerhead brassicas (includes Broccoli: Broccoli, Chinese and cauliflower)	5 mg/kg
Gherkin	3 mg/kg
Ginseng, dried including red ginseng	2 mg/kg
Gooseberry	20 mg/kg
Grapes	3 mg/kg
Horseradish	1 mg/kg
Leek	40 mg/kg
Mammalian fats (except milk fats)	0.07 mg/kg
Meat (from mammals other than marine mammals)	0.02 mg/kg
Melons, except watermelon	2 mg/kg
Milks	0.07 mg/kg
Onion, bulb	1.5 mg/kg
Onion, Chinese	10 mg/kg
Onion, Welsh	10 mg/kg
Papaya	20 mg/kg
Peaches (including apricots and nectarine) (subgroup)	1.5 mg/kg
Peanut	0.1 mg/kg
Peppers	7 mg/kg

	Peppers chili, dried	70 mg/kg	
	Pistachio nuts	0.3 mg/kg	
	Poultry fats	0.01 mg/kg	
	Poultry meat	0.01 mg/kg	
	Poultry skin	0.01 mg/kg	
	Poultry, edible offal of	0.07 mg/kg	
	Pulses	1 mg/kg	
	Rhubarb	7 mg/kg	
	Root and tuber vegetables	0.3 mg/kg	
	Shallot	1.5 mg/kg	
	Spring onion	10 mg/kg	
	Squash, summer	3 mg/kg	FAO <sup>(1)</sup>
	Strawberry	5 mg/kg	
	Tomato	5 mg/kg	
Dacthal (DCPA) (1861-32-1) 4,4'-DDD (72-54-8) 4,4'-DDE (72-55-9) 4,4'-DDT (50-29-3) Dieldrin (60-57-1)	Carrot	0.2 mg/kg	FAO <sup>(1)</sup>
	Cereal grains	0.1 mg/kg	
	Eggs	0.1 mg/kg	
	Meat (from mammals other than marine mammals)	5 mg/kg	
	Milks	0.02 mg/kg	
	Poultry meat	0.3 mg/kg	
Endosulfan I (959-98-8) Endosulfan II (33213-65-9) Endosulfan sulfate (1031-07-8)	Avocado	0.5 mg/kg	FAO <sup>(1)</sup>
	Cacao beans	0.2 mg/kg	
	Coffee beans	0.2 mg/kg	
	Cotton seed	0.3 mg/kg	
	Cucumber	1 mg/kg	



Custard apple	0.5 mg/kg
Egg plant	0.1 mg/kg
Eggs	0.03 mg/kg
Hazelnuts	0.02 mg/kg
Kidney of cattle, goats, pigs and sheep	0.03 mg/kg
Litchi	2 mg/kg
Liver of cattle, goats, pigs & sheep	0.1 mg/kg
Macadamia nuts	0.02 mg/kg
Mango	0.5 mg/kg
Meat (from mammals other than marine mammals)	0.2 mg/kg
Melons, except watermelon	2 mg/kg
Milk fats	0.1 mg/kg
Milks	0.01 mg/kg
Papaya	0.5 mg/kg
Persimmon, American	2 mg/kg
Potato	0.05 mg/kg
Poultry meat	0.03 mg/kg
Poultry, edible offal of	0.03 mg/kg
Soya bean (dry)	1 mg/kg
Soya bean oil, crude	2 mg/kg
Spices, fruits and berries	5 mg/kg
Spices, roots and rhizomes	0.5 mg/kg
Spices, seeds	1 mg/kg
Squash, summer	0.5 mg/kg
Sweet potato	0.05 mg/kg

	Tea, green, black (black, fermented and dried)	10 mg/kg	
	Tomato	0.5 mg/kg	
Endrin (72-20-8)	Poultry	0.1 mg/kg	FAO <sup>(1)</sup>
	Fruiting vegetables, cucurbits	0.05 mg/kg	
α-HCH (319-84-6) β-HCH (319-85-7) δ-HCH (319-86-8)	Beans (dry)	3 mg/kg	FAO <sup>(1)</sup>
	Beans, except broad bean and soya bean	0.5 mg/kg	
	Chick-pea (dry)	0.05 mg/kg	
γ-HCH (Lindane) (58-89-9)	Citrus fruits	0.02 mg/kg	FAO <sup>(1)</sup>
	Coffee beans	0.02 mg/kg	
	Cotton seed	0.7 mg/kg	
	Edible offal (mammalian)	2 mg/kg	
	Eggs	0.1 mg/kg	
	Fodder beet	0.4 mg/kg	
	Grapes	0.02 mg/kg	
	Onion, bulb	0.2 mg/kg	
	Peanut fodder	5 mg/kg	
	Peas (dry)	0.2 mg/kg	
	Peas (pods and succulent=immature seeds)	0.7 mg/kg	
	Peas, shelled (succulent seeds)	1 mg/kg	
	Pome fruits	0.02 mg/kg	
	Rape seed	3 mg/kg	
	Soya bean (dry)	2 mg/kg	
	Stone fruits	0.02 mg/kg	
	Sugar beet	0.4 mg/kg	
	Sunflower seed	0.3 mg/kg	

Heptachlor (76-44-8) Heptachlor epoxide (1024-57-3)	Citrus fruits	0.01 mg/kg	FAO <sup>(1)</sup>
	Cotton seed	0.02 mg/kg	
	Eggs	0.05 mg/kg	
	Meat (from mammals other than marine mammals)	0.2 mg/kg	
	Milks	0.006 mg/kg	
	Pineapple	0.01 mg/kg	
	Poultry meat	0.2 mg/kg	
	Soya bean (immature seeds)	0.02 mg/kg	
	Soya bean oil, crude	0.5 mg/kg	
	Soya bean oil, refined	0.02 mg/kg	
Hexachlorocyclopentadiene (HCCPD) (77-47-4)	Currants, black, red, white	0.1 mg/kg	FAO <sup>(1)</sup>
	Grapes	0.3 mg/kg	
	Oranges, sweet, sour (including Orange-like hybrids) (subgroup)	0.2 mg/kg	
	Pear	0.2 mg/kg	
	Peppers chili, dried	5 mg/kg	
Methoxychlor (72-43-5)	Barley	0.05 mg/kg	FAO <sup>(1)</sup>
	Barley straw and fodder, dry	0.05 mg/kg	
	Brussels sprouts	0.05 mg/kg	
	Cabbages, head	0.1 mg/kg	
	Cauliflower	0.1 mg/kg	
	Hazelnuts	0.05 mg/kg	
	Leek	0.5 mg/kg	
	Lettuce, head	0.05 mg/kg	
	Maize	0.05 mg/kg	

	Melons, except watermelon	0.2 mg/kg	
	Onion, bulb	0.5 mg/kg	
	Pea hay or pea fodder (dry)	0.5 mg/kg	
	Peas (dry)	0.1 mg/kg	
	Peas (pods and succulent=immature seeds)	0.1 mg/kg	
	Peppers, sweet (including pimento or pimiento)	2 mg/kg	
	Potato	0.05 mg/kg	
	Rape seed	0.05 mg/kg	
	Spices, fruits and berries	0.07 mg/kg	
	Spices, roots and rhizomes	0.1 mg/kg	
	Strawberry	1 mg/kg	
	Sugar beet	0.05 mg/kg	
	Sunflower seed	0.05 mg/kg	
	Wheat	0.05 mg/kg	
	Wheat straw and fodder, dry	0.05 mg/kg	
<i>trans</i> -Nonachlor (39765-80-5)	Blueberries	7 mg/kg	FAO <sup>(1)</sup>
	Brassica (cole or cabbage) vegetables, head cabbage, flowerhead brassicas	0.7 mg/kg	
	Chard	15 mg/kg	
	Common bean (pods and/or immature seeds)	0.7 mg/kg	
	Cotton seed	0.5 mg/kg	
	Edible offal (mammalian)	0.7 mg/kg	
	Eggs	0.1 mg/kg	
	Fruiting vegetables other than cucurbits	0.7 mg/kg	
	Fruiting vegetables, cucurbits	0.2 mg/kg	

	Meat (from mammals other than marine mammals)	10 mg/kg	
	Milk fats	7 mg/kg	
	Milks	0.4 mg/kg	
	Mustard greens	25 mg/kg	
	Pome fruits	3 mg/kg	
	Potato	0.01 mg/kg	
	Poultry meat	0.5 mg/kg	
	Poultry, edible offal of	0.1 mg/kg	
	Prunes, dried	3 mg/kg	
	Soya bean (immature seeds)	0.01 mg/kg	
	Stone fruits	7 mg/kg	
	Strawberry	0.5 mg/kg	
	Sugar cane	0.5 mg/kg	
	Sweet corn fodder	40 mg/kg	
<i>cis</i> -Permethrin (61949-76-6) <i>trans</i> -Permethrin (61949-77-7)	Almonds	0.1 mg/kg	FAO <sup>(1)</sup>
	Asparagus	1 mg/kg	
	Beans (dry)	0.1 mg/kg	
	Blackberries	1 mg/kg	
	Broccoli	2 mg/kg	
	Brussels sprouts	1 mg/kg	
	Cabbage, Savoy	5 mg/kg	
	Cabbages, head	5 mg/kg	
	Carrot	0.1 mg/kg	
	Cauliflower	0.5 mg/kg	
	Celery	2 mg/kg	

Cereal grains	2 mg/kg
Chinese cabbage (type pe-tsai)	5 mg/kg
Citrus fruits	0.5 mg/kg
Coffee beans	0.05 mg/kg
Common bean (pods and/or immature seeds)	1 mg/kg
Cotton seed	0.5 mg/kg
Cotton seed oil, edible	0.1 mg/kg
Cucumber	0.5 mg/kg
Currants, black, red, white	2 mg/kg
Dewberries (including boysenberry and loganberry)	1 mg/kg
Edible offal (mammalian)	0.1 mg/kg
Egg plant	1 mg/kg
Eggs	0.1 mg/kg
Gherkin	0.5 mg/kg
Gooseberry	2 mg/kg
Grapes	2 mg/kg
Hops, dry	50 mg/kg
Horseradish	0.5 mg/kg
Kale (including: Collards, curly, Scotch and thousand-headed kale;	5 mg/kg
Kiwifruit	2 mg/kg
Kohlrabi	0.1 mg/kg
Leek	0.5 mg/kg
Lettuce, head	2 mg/kg
Maize fodder (dry)	100 mg/kg
Meat (from mammals other than marine mammals)	1 mg/kg

Melons, except watermelon	0.1 mg/kg	FAO <sup>(1)</sup>
Milks	undefined	
Mushrooms	0.1 mg/kg	
Peanut	0.1 mg/kg	
Peas, shelled (succulent seeds)	0.1 mg/kg	
Peppers	1 mg/kg	
Peppers chili, dried	10 mg/kg	
Pistachio nuts	0.05 mg/kg	
Pome fruits	2 mg/kg	
Potato	0.05 mg/kg	
Poultry meat	0.1 mg/kg	
Radish, Japanese	0.1 mg/kg	
Rape seed	0.05 mg/kg	
Raspberries, red, black	1 mg/kg	
Sorghum straw and fodder, dry	20 mg/kg	
Soya bean (dry)	0.05 mg/kg	
Soya bean fodder	50 mg/kg	
Soya bean oil, crude	0.1 mg/kg	
Spices	0.05 mg/kg	
Spinach	2 mg/kg	
Spring onion	0.5 mg/kg	
Squash, summer	0.5 mg/kg	
Stone fruits	2 mg/kg	
Strawberry	1 mg/kg	
Sugar beet	0.05 mg/kg	

Sunflower seed	1 mg/kg
Sunflower seed oil, crude	1 mg/kg
Sunflower seed oil, edible	1 mg/kg
Sweet corn (corn-on-the-cob)	0.1 mg/kg
Sweet corn fodder	50 mg/kg
Table olives	1 mg/kg
Tea, green, black (black, fermented and dried)	20 mg/kg
Tomato	1 mg/kg
Wheat bran, unprocessed	5 mg/kg
Wheat flour	0.5 mg/kg
Wheat germ	2 mg/kg
Wheat wholemeal	2 mg/kg
Winter squash	0.5 mg/kg

**Reference:**

- 1) <http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/pesticides/en/>



## LIMITS OF MAJOR ELEMENTS IN NON-POLLUTED AGRICULTURAL SOILS:

Testing parameter	Limits (g/kg)	Reference for Limit
Aluminum (Al)	10 - 80	EPA <sup>(1)</sup>
Calcium (Ca)	5 - 30	EPA <sup>(1)</sup>
Iron (Fe)	10 - 50	EPA <sup>(1)</sup>
Magnesium (Mg)	1 - 15	EPA <sup>(1)</sup>
Nitrogen (N)	1 - 4	EPA <sup>(1)</sup>
Phosphorus (p)	0.2 - 2	EPA <sup>(1)</sup>
Potassium (K)	1 - 30	EPA <sup>(1)</sup>
Silicon (Si)	150 - 400	EPA <sup>(1)</sup>
Sodium (Na)	0.5 - 15	EPA <sup>(1)</sup>
Sulphur (S)	0.2 - 1.5	EPA <sup>(1)</sup>

## LIMITS OF TRACE ELEMENTS IN NON-POLLUTED AGRICULTURAL SOILS:

Testing parameter	Limits (mg/kg)	Reference for Limit
Antimony (Sb)	0.2 - 3.0	EPA <sup>(1)</sup>
Arsenic (As)	1 - 50	EPA <sup>(1)</sup>
Boron (B)	20 - 1000	EPA <sup>(1)</sup>
Cadmium (Cd)	0.1 - 1	EPA <sup>(1)</sup>
Chlorine (Cl)	3 - 300	EPA <sup>(1)</sup>
Chromium (Cr)	5 - 250	EPA <sup>(1)</sup>
Cobalt (Co)	1 - 25	EPA <sup>(1)</sup>
Copper (Cu)	2 - 100	EPA <sup>(1)</sup>
Fluorine (F)	20 - 700	EPA <sup>(1)</sup>
Iodine (I)	2 - 20	EPA <sup>(1)</sup>
Lead (Pb)	2 - 80	EPA <sup>(1)</sup>
Manganese (Mn)	20 - 3000	EPA <sup>(1)</sup>
Mercury (Hg)	0.03 - 0.8	EPA <sup>(1)</sup>
Molybdenum (Mo)	0.2 - 3	EPA <sup>(1)</sup>
Nickel (Ni)	0.5 - 100	EPA <sup>(1)</sup>
Selenium (Se)	0.2 - 2	EPA <sup>(1)</sup>
Thallium (Tl)	0.1 - 0.5	EPA <sup>(1)</sup>
Tin (Sn)	1 - 40	EPA <sup>(1)</sup>
Vanadium (V)	20 - 250	EPA <sup>(1)</sup>
Zinc (Zn)	10 - 200	EPA <sup>(1)</sup>

## LIMITS OF ORGANIC VOLATILE IMPURITIES FOR SOIL

Testing parameter	Limits (mg/L)	Reference for Limit
Benzene	5	FAO <sup>(2)</sup>
Carbon Tetrachloride	5	FAO <sup>(2)</sup>
1,2-Dichloroethane	5	FAO <sup>(2)</sup>
1,1-Dichloroethylene	0.5	FAO <sup>(2)</sup>
cis-1,2-Dichloroethylene	40	FAO <sup>(2)</sup>
Trans-1,2-Dichloroethylene	60	FAO <sup>(2)</sup>
Dichloromethane	90	FAO <sup>(2)</sup>
Ethylbenzene	200	FAO <sup>(2)</sup>
Styrene	1,000	FAO <sup>(2)</sup>
Tetrachloroethylene	50	FAO <sup>(2)</sup>
Toluene	500	FAO <sup>(2)</sup>
Trichloroethylene	30	FAO <sup>(2)</sup>
1,1,1-Trichloroethane	600	FAO <sup>(2)</sup>
1,1,2-Trichloroethane	10	FAO <sup>(2)</sup>
Total Xylenes	200	FAO <sup>(2)</sup>

### References:

- 1) [https://www.epa.ie/pubs/reports/land/EPA\\_soil\\_discussion.pdf](https://www.epa.ie/pubs/reports/land/EPA_soil_discussion.pdf)
- 2) <http://extwprlegs1.fao.org/docs/pdf/tan151538.pdf>