

**Table 5.1: Summary of guidelines for irrigation water quality** (mg/L unless otherwise stated)

Parameter	Guidelines	Comment
<i>Major ions</i>		
Bicarbonate		No guideline recommended due to interaction with other factors
Chloride	30-700 (Tables 5.2, 5.3, 5.4 below)	Maximum concentration should be set according to sensitivity of crop
Sodium	(Table 5.5 below)	
Total dissolved solids	(Table 5.6 below)	
<i>Heavy metals and trace ions</i>		
Aluminium	5.00	High toxicity in acid soils
Arsenic	0.10	
Beryllium	0.10	
Boron	0.5-6.0	Table 5.8 below
Cadmium	0.01	Higher toxicity in acid soils
Chromium	1.00	Limit chromium (VI) concentration to 0.1 mg/L
Cobalt	0.05	
Copper	0.2	
Fluoride	1.00	
Lead	0.20	
Lithium	2.50	Citrus: 0.075 mg/L
Manganese	2.00	If acid soils, limit to 0.2 mg/L
Mercury	0.002	
Molybdenum	0.01	
Nickel	0.2	
PH (CaCl <sub>2</sub> )	4.5-9.0	
Selenium	0.02	
Uranium	0.01	
Vanadium	0.10	
Zinc	2.0	1 mg/L is recommended for sandy soil below pH 6

**Table 5.2 Chloride tolerance of fruit and woody crops by root uptake**

Rootstocks	Chloride in irrigation water (mg/L)	Cultivars	Chloride in irrigation water (mg/L)
Grapes	710-960	Boysenberry	250
Stone-fruits (peaches, plums etc)	180-600	Blackberry, Raspberry	
Strawberries	110-180		

**Table 5.3 Chloride concentrations in irrigation water causing foliar damage**

Sensitivity	Chloride (mg/L)	Affected crop
Sensitive	<178	Almond, apricot, plum
Moderately sensitive	178-355	Grape, pepper, potato, tomato
Moderately tolerant	355-710	Alfalfa, barley, corn, cucumber
Tolerant	>710	Cauliflower, cotton, safflower, sesame, sorghum, sugar beet, sunflower

**Table 5.4 Tolerance of chloride sensitive crops to chloride in irrigation water**

Crop	Irrigation Method	Maximum chloride concentrations (mg/L)
Citrus	Overhead sprinklers	100
	Under-tree sprinkler	265
Stone-fruit	Overhead sprinklers	70
	Under-tree sprinkler	175
Vines	-	350
Tobacco	Overhead sprinklers	30

**Table 5.5 Tolerance of crops to sodium**

Tolerance	SAR of irrigation water	Crop	Condition
Very sensitive	2-8	Deciduous fruits, nuts, citrus, avocado	Leaf tip burn, leaf scorch
Sensitive	8-18	Beans	Stunted, soil structure favourable
Moderately tolerant	18-46	Clover, oats, tall fescue, rice	Stunted due to nutrition and soil structure
Tolerant	46-102	Wheat, lucerne, barley, tomatoes, beets, tall wheat grass, crested grass, fairway grass	Stunted due to poor soil structure

**Table 5.6 General guidelines for salinity of irrigation water**

Class	Comment	Electrical conductivity ( $\mu\text{S}/\text{cm}$ )	TDS (mg/L)
1	Low-salinity water can be used with most crops on most soils and with all methods of water application with little likelihood that a salinity problem will develop. Some leaching is required, but this occurs under normal irrigation practices except in soils of extremely low permeability.	0-280	0-175
2	Medium-salinity water can be used if moderate leaching occurs. Plants with medium salt tolerance can be grown, unusually without special measures for salinity control. Sprinkler irrigation with the more-saline waters in this group may cause leaf scorch on salt-sensitive crops, especially at high temperatures in the daytime and with low application rates	280-800	175-500
3	High-salinity water cannot be used on soils with restricted drainage. Even with adequate drainage, special management for salinity control may be required, and the salt tolerance of the plants to be irrigated must be considered.	800-2,300	500-1,500
4	Very high-salinity water is not suitable for irrigation water under ordinary conditions. For use, soils must be permeable, drainage adequate, water must be applied in excess to provide considerable leaching, and salt-tolerant crops should be selected.	2,300-5,500	1,500-3,500
5	Extremely high-salinity water may be used only on permeable, well-drained soils under good management, especially in relation to leaching and for salt-tolerant crops, or for occasional emergency use	>5,500	>3,500

**Table 5.8 Relative tolerance of agricultural crops to boron**

Tolerance*	Concentration of boron in soil water (mg/L)**	Agricultural crop
Very sensitive	<0.5	Blackberry
Sensitive	0.5-1.0	Peach, cherry, plum, grape, cowpea, onion, garlic, sweet potato, wheat, barley, sunflower, mung bean, sesame, lupin, strawberry, Jerusalem artichoke, kidney beans, lima beans
Moderately sensitive	1.0-2.0	Red pepper, pea, carrot, radish, potato, cucumber
Moderately tolerant	2.0-4.0	Lettuce, cabbage, celery, turnip, Kentucky bluegrass, oat, corn, artichoke, tobacco, mustard, clover, squash, musk melon
Tolerant	4.0-6.0	Sorghum, tomato, alfalfa, purple, vetch, parsley, red beet, sugar-beet
Very tolerant	6.0-15.0	Asparagus

\* Tolerance will vary with climate, soil conditions and crop varieties; values are to be used as a guideline only

\*\* Maximum concentrations tolerated in irrigation water without reduction in yield or vegetative growth are approximately equal to soil water values.