

Water Guidelines

August 26, 2011 Cancun



Water quality guidelines

Table 1. Key irrigation water quality factors, and the likelihood (low, medium or high) that water with each factor will cause soil problems. Guidelines are based upon FAO handbook 29 and PACE Turf observations. Note that for each range of SAR values, the potential for soil problems is related to the ECw of the irrigation water as well.

	Likelihood of Soil Problems		
	Low	Medium	High
ECw (dS/m,mmhos/cm)	< 0.7	0.7 - 3.0	> 3.0
TDS (mg/l, ppm)	< 450	450 - 2000	>2000
SAR 0 - 3	ECw > 0.7	ECw 0.7 - 0.2	ECw < 0.2
SAR 3 - 6	ECw > 1.2	ECw 1.2 - 0.3	ECw < 0.3
SAR 6 - 12	ECw > 1.9	ECw 1.9 - 0.5	ECw < 0.5
SAR 12 - 20	ECw > 2.9	ECw 2.9 - 1.3	ECw < 2.9
Sodium Na (me/l)	< 3	3 - 9	> 9
Sodium Na (mg/l, ppm)	< 70	70 - 200	> 200
RSC (me/l)	< 1.25	> 1.25	
Nitrate NO ₃ - N (mg/l, ppm)	< 5	5 - 20	> 30
Ammonium NH ₄ - N (mg/l,ppm)	<5	5 - 20	> 20
Boron B (mg/l, ppm)	< 0.5	0.5 - 3.0	> 3.0
Bicarbonate HCO ₃ (me/l)	< 1.5	1.5 - 8.5	> 8.5
Bicarbonate HCO ₃ (mg/l, ppm)	92	92 - 520	> 520
Chloride Cl (me/l)	< 3	> 3	
Chloride Cl (mg/l, ppm)	< 105	> 105	

ECw = Electrical conductivity of the irrigation water

TDS = Total Dissolved Salts

SAR = Sodium Adsorption Ratio

RSC = Residual Sodium Carbonate

NOTE on SAR values: For the most accurate estimate of sodium hazard, we suggest that you use adj RNa values instead of SAR values and compare them against the SAR guidelines above to predict sodium hazard. If you are using water quality report estimates of adj SAR and the report lists pHc, you may be using values that overestimate the sodium hazard by as much as two-fold.

Table 2. Examples of water quality from a variety of sources. Note that, depending on the quality of well water, recycled water may have higher quality than well water.

	No restriction	Domestic	Rain	Recycled	Poor quality well	Good quality well
EC dS/m	<0.8	0.7	0.1	1.1	4.02	0.6
TDS ppm	<525	499	46	723	2573	378
pH	6.5-7.8	7.8	6.3	7.2	7.5	8.1
SAR	<3.0	2.7	0.5	4	5.2	0.9
Bicarbonate (HCO ₃ ppm)	<50	134	26	201	364	266
Sodium (Na ppm)	<100	85	5.6	147	407	30.5
RSC meq/l	<1.0	0.04	0	0.12	0	0
Boron (B ppm)	<0.5	0.22	0.03	0.42	0.41	0.06
Chloride (Cl ppm)	<90	74	0.7	149	1004	45
Nitrate (NO ₃ -N ppm)	<8.0	3.2	---	7.3	---	3.6

Table 3. Examples of water quality from Cancun golf courses.

	Playacar pump sta.	Playacar sprinkler 13	Moon sprinkler 14	Moon pump sta. Dunes	Riviera
EC dS/m	2.9	2.4	1.7	1.5	1.8
TDS ppm	1864	1564	1107	962	1125
pH	8.9	8.1	7.9	8.2	8.6
SAR	6.5	5.86	5.9	4.1	6.0
HCO ₃ ppm	231	298	182	124	171
Na ppm	296	289	230	184	228
RSC meq/l	0	0	0	0	0
B ppm	0.07	0.07	0.2	0.03	0.2
Cl ppm	529	518	507	386	507

ECw = Electrical Conductivity of irrigation water
TDS = Total Dissolved Salts
SAR = Sodium Adsorption Ratio
RSC = Residual Sodium Carbonate