

2.5 Appropriate techniques for water preparation

Water preparation is basically neutralization of bicarbonates in the water. It is measured in different scales for example in ppm, mg/l, French degrees or German hardness degrees - dH, one unit means 17,8 mg of bicarbonates per liter of water. Water hardness is determined by the concentration of multivalent cations in the water. Common cations found in hard water include Ca^{2+} and Mg^{2+} which comes from the lime and dolomite minerals in the ground. When using crystallized water soluble fertilizers, electric conductivity (EC) must be measured to avoid salinization of the irrigation water and substrate. Every fertilizer has EC values written on the bag. After five cycles of adding fertilizers, the water reservoir should be drained and filled with fresh water. The drainage water can be used for watering outdoor plants.

A fertilization regime must be followed in order to ensure good flowering, hardy plants, avoid excess growth and, consequently, poor resistance to diseases and pests. Use fertilizers with Nitrate and a higher Potassium ratio for compact growth. Phosphorus should be higher before the buds form. Magnesium (Mg) and Iron (Fe) are important for dark colour and consistency of the leaves. Other micronutrients must also be added. If using rain water or soft water, it is necessary to add Calcium (Ca) and Magnesium (Mg). Nutrient concentrations can be measured using an EC meter to control the level of the fertilizers. In a hydroponic system the EC level should be 0.50-0.90 mS/cm, while in a system with a mineral substrate it may be as high as 1.20 mS/cm. Recycled water loses nutrients which should be added occasionally. The pH value should be between 5.5 and 6.2 (standard dosage 100-300 ml/1000 l of water). Phosphoric, nitrate or citric acid may be added to lower the pH. Complex systems have automatic regulation of water EC and pH levels.

Winter irrigation must be ensured even in cold, freezing conditions, as the leaves become dehydrated by the wind and solar radiation. It can be done by manual showering with warm water, or by opening the irrigation on a warm day. Winter drought is very common problem for living walls in colder areas.

Sometimes water disinfection is needed to prevent soil borne diseases. For this purpose Benzoic acid or chlorine can be used, mixed into the irrigation water.

	mmol/L	ppm, mg/L	dGH, °dH	gpg	°e, °Clark	°fH
mmol/L	1	0.009991	0.1783	0.171	0.1424	0.09991
ppm, mg/L	100.1	1	17.85	17.12	14.25	10
dGH, °dH	5.608	0.05603	1	0.9591	0.7986	0.5603
gpg	5.847	0.05842	1.043	1	0.8327	0.5842
°e, °Clark	7.022	0.07016	1.252	1.201	1	0.7016
°fH	10.01	0.1	1.785	1.712	1.425	1

Figure 1: Hardness unit conversion.

Source: www.humko.si

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