DO (Dissolved Oxygen)

Obviously, fish need oxygen to breathe; plants need oxygen at night and the beneficial bacteria need oxygen to break down (oxygenate) waste. Basically, everything that dies off or decays in the aquarium requires and therefore depletes oxygen. Unhealthy or dead plants, decaying live rock and live sand and uneaten food all suck oxygen out of the water. Organic acids, proteins and carbohydrates can also reduce the oxygen level in the aquarium.

Oxygen enters the water through gas exchange via surface agitation in aquaponics systems. The amount of oxygen that can be dissolved (saturated) in the water is dependent on the water temperature. Increasing temperatures decreases oxygen saturation.

The following table shows saturation levels at different temperatures.

C	0	C	0	C	0
0	14.60	**16**	9.85	**30**	7.54
1	14.19	**17**	9.65	**31**	7.41
2	13.81	**18**	9.45	**32**	7.28
3	13.44	**19**	9.26	**33**	7.16
4	13.09	**20**	9.07	**34**	7.05
5	12.12	**21**	8.90	**35**	6.93
8	11.83	**22**	8.72	**36**	6.82
9	11.55	**23**	8.56	**37**	6.71
10	11.27	**24**	8.40	**38**	6.61
11	11.01	**25**	8.24	**39**	6.51
12	10.76	**26**	8.09	**40**	6.41
13	10.52	**27**	7.95	**41**	6.31
14	10.29	**28**	7.81	**42**	6.22
15	10.07	**29**	7.67	**43**	6.13

Figure 7 Dissolved Oxygen Chart

For example, a freshwater aquarium with a temperature of 24 C can dissolve 8.4 ppm of oxygen.

Low oxygen levels in the fish tank will result in fish attempting to 'breathe' faster than normal resulting in chronic stress and eventual fish deaths. Different fish require different amounts of dissolved oxygen in the water. Adequate aeration is essential for the fish tank at all times and especially during warmer summer months as the water temperature rises.

Total hardness (GH) & Carbonate hardness (KH)

Water hardness is about dissolved minerals. The total hardness is usually regarded as consisting of two components: general hardness (GH) and carbonate hardness (KH).