KH HARDNESS 30 TEST KIT

Water hardness is the measure of only part of the total dissolved salts in solution. Consisting of mainly Calcium, Magnesium bicarbonates, and to a lesser extent Iron, Copper, Zinc etc. These and other metallic ions along with chlorides & sulphates, make up the value of total water hardness also known as general hardness sometimes designated “GH”. Within this overall general hardness you can sub-divide the hardness into two, firstly you have “permanent Hardness” and secondly the “temporary Hardness”. The easiest way to think of these two parts is that if you were to boil water, the temporary hardness would be removed by precipitation and only the permanent hardness salts would remain in solution.
Temporary hardness, also known as the bi-carbonate hardness, is designated “KH” and forms the majority of the overall general hardness. The major components within temporary hardness and Calcium and Magnesium bicarbonates with Calcium bicarbonates ions being in the majority up to 10 times more present than magnesium. In a pond water environment with the sheer volumes of water involved, the general hardness rarely changes. Water softening devices such as R.O. units, are commonly used on aquariums, which can remove salts therefore lowering pH for fish such as discus that prefer low pH levels. pH is the key reason for testing KH levels, not GH as generally little modification can be achieved for large volumes of water. Water softeners usually will not alter the pH of water as the action of these units is to convert Calcium / Magnesium bicarbonates in to sodium bicarbonates. Hardness does influence the pH of pond water and is very relevant particularly in soft water areas. Very soft water with little bicarbonates will generally cause a pH level to be low or subject to “swings” of pH valve, undesirable for Koi. Generally the greater the hardness of water the higher the pH will be. The hardness of water is related to the source, if the supply is taken from chalky or limestone areas, the nature of these minerals and solvency properties of water will usually mean hardness levels will be high.
Calcium and Magnesium salts contribute to alkalinity as well as water hardness. In simple terms alkalinity closely reflects temporary hardness. This is because temporary hardness is caused mainly by bicarbonates ions, which are mainly responsible for the water alkalinity - again another of the level of the pH value. A true test for temporary hardness only would be a specific alkalinity test kit. For example, measuring the value of all of the bicarbonates only.

Koi utilise bicarbonates and other mineral ions for osmoregulation and vital physiological functions, colour and pigmentation can vary depending upon the level of hardness of the water. Koi are however quite resilient and will adjust to a wide range of hardness values in time. Recommended absolute minimum level for koi is 50mg/l, 100 - 300 mg/l is normal. Adding Kusuri Klay even in hard water areas will benefit all fish as mineral ions need to be replaced that are naturally taken up by Koi.
Low water hardness will normally result in a low or even varying pH level. The pH level should be monitored regularly, an absolute minimum pH level acceptable for Koi is 7.0. In low water hardness areas, the hardness level effects the buffering ability to the water to resist swings in pH especially where bicarbonates are low. Adding Kusuri Lithaqua filter media is a more long term answer - it is high in Calcium bicarbonates and will increase the alkalinity, raising pH and increase the “buffering” capacity to reduce swings in pH levels. Balance is the key issue. In low hardness areas, adding bicarbonate of soda products can be fraught with danger.
To much to often, and pH could sour to high. Too little and the alkalinity and pH level drops again, without addressing the real issue of improving the temporary hardness level. All fish including Koi prefer a stable pH.

Conversion scales used in differing countries

Scale	Origin	Equivalent in terms of mg/litre CaCO3	Conversion factor of mg/litre
°Hardness	USA	1mg/litre CaCO3	No conversion req
°Clark	UK	14.3mg/litre CaCO3	14.3
°dH	Germany	17.9mg/litre CaCO3	17.9
°tH	France	20mg/litre CaCO3	20.0

Mg/litre CaCO3	in °dH (most common scale)	Comparatively
0 to 50	0 to 3	Soft
50 to 100	3 to 6	Moderately soft
100 to 200	6 to 12	Slightly hard
200 to 300	12 to 18	Moderately hard
300 to 450	18 to 25	Hard
Over 450	25 +	Very hard

How to use this KH kit

1. Rinse out 50ml dilution flask with pond water then fill with pond water to the 50ml mark.
2. Add 1 tablet and shake to dissolve
3. Continue adding tablets in this manner, (noting the amount used) until the colour changes from plum red to blue
4. Calculate the hardness in mg/litre of CaCO3, by this simple equation (n x 40) MINUS 20 = mg/litre CaCO3 N = Number of tablets used

Example: (Tablets used 10) so... N = 10 Therefore
10 x 40 = 400 - 20 = 380 mg/litre CaCO3
To convert to °dH scale divide result by 17.9. = 21.2 °dH