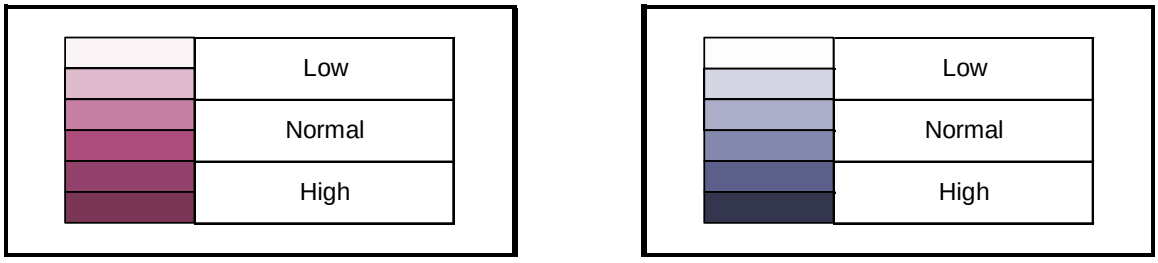
# Perpetual Preservation System™

## How to test for Nitrates and Phosphates

Often times we wonder what the correct numerical value should be for Nitrates (NO3) and Phosphates (PO4). However, it is dramatic changes to these levels that often lead to problems within the aquarium. We test regularly to determine what the appropriate level of these elements should be, yet we are often unclear as to how to appropriate read and utilize the results. The following will demonstrate not only how to read your results using the Perpetual Preservation System (PPS) but also how to determine if your testing is accurate.

By using PPS you are attempting to maintain balance within your tank, you want to keep things stable or within a normal range. Looking at your test kits you often see 5 or more colour values ranging anywhere between 5ppm to 110ppm for NO3, or 0ppm to 5ppm for PO4. These values although helpful is not what you should be concentrating on initially, it is best to view these charts in terms of "low" "normal" and "high". Therefore, divide these charts into 3 areas using the numerical values or based on the number of colours for different values. The lower values will represent a low reading the middle values will represent a normal reading and finally the higher values will represent a high reading (see figure below). Now when you begin testing, your results will not be in ppm but rather as low, normal or high, and your course of action will be to bring it to normal and not to exactly 20ppm allowing you room to fiddle to find the sweet spot for your individual tank.




Now to properly read the results and to train your eye to spot the difference between the different colours presented in test kits it is imperative that you calibrate your test kits. In other words mix a solution of water containing exactly 5ppm of NO3 and test, followed by 10ppm of NO3 and test and so on, do the same for PO4 and see which colour matches closest to your test tube. The reason why we want to calibrate the charts is due to printing errors, potential fading of colours, light source, wall paint colour etc.

The appropriate way to calibrate your test kits is as follows. By preparing a stock solution of elements also known as Standard Solution (using PPS terminology) that you would normally add to your tank, (the SS recipe may be found below) then by preparing two buckets with 10 liters of tap water with no or very low levels of NO3 and PO4 or distilled water or Reverse Osmosis (RO) water to which you will add the following drops or ml of Standard Solution.

**To test NO3 using the following Standard Solution mix**

2 ml in 10 l = 5 ppm
4 ml in 10 l = 10 ppm
8 ml in 10 l = 20 ppm
12 ml in 10 l = 30 ppm
16 ml in 10 l = 40 ppm
20 ml in 10 l = 50 ppm

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**To test PO4 using the following Standard Solution mix**
0.20 ml or 2 drops in 10 l = 0.1 ppm
0.30 ml or 6 drops in 10 l = 0.25 ppm
0.60 ml or 12 drops in 10 l = 0.50 ppm
1.20 ml or 24 drops in 10 l = 1.00 ppm
3.00 ml or 60 drops in 10 l = 2.50 ppm
6.00 ml or 120 drops in 10 l = 5.00 ppm

By comparing the results obtained from the test water to your test kit you are now able to properly interpret the colour results. These tests need only be done once and do not need to be repeated every time you buy the same test kit.

**Standard Solution**

Ratio of NO3:PO4:K is 0.75:0.25:1.00

KNO3 - 20.38 g
KH2PO4 - 5.97 g
K2SO4 - 15.74 g

in 500ml of water

## Appendix 1

# Perpetual Preservation System™

| Category | | NO3 – PO4 | Ca -Mg | KH – pH – CO2 | Trace Elements |
|---|---|---|---|---|---|
| | | | | | |
| **Article** | | Volume 1, Issue 1<br>Volume 2, Issue 1 | Volume 2, Issue 2 | Volume 2, Issue 3 | Volume 2, Issue 4 |
| **Required Levels** | | NO3 Low-Normal-High<br>PO4 Low-Normal-High | Ca 20 - 30 ppm<br>Mg 5 - 10 ppm | KH Use Table<br>pH Specie selectable<br>CO2 30 - 40 ppm | See Article |
| **Test Kits** | | NO3, PO4 | GH, Ca | KH, pH | |
| **Solution Fertilizer** | | SS Standard Solution<br>PF PO4-Free Solution<br>NF NO3-Free Solution | Mg Solution | | TE Solution |
| **Dry Fertilizer** | | | Discus Mix | CaCO3 Calcium Carbonate<br>NaHCO3 Baking Soda | |