

Chemical Parameters of Tropical Reef Aquariums

Creating a **tropical reef aquarium**, means that to make an ecosystem to mimic conditions of a real coral reef so that fish, corals, and other sea creatures can survive. To achieve this the **water chemistry** must meet optimal levels and be regularly tested.

Each parameter below is essential for marine species to thrive.

1. Calcium (Ca)

Corals use calcium to build their hard skeletons (like bones for humans).

If calcium is too low, corals can't grow properly.

2. Alkalinity (KH or Alk)

This measures how stable the water is against sudden pH changes.

Think of it like buffering the water so things don't swing wildly—because sudden changes stress or kill corals.

3. Salinity

This is how salty the water is. Reef animals are used to ocean salt levels, so keeping this steady is super important.

4. Temperature

Most reef creatures like warm, tropical water.

Keeping it **27–28°C (78–80°F)** makes them comfortable and healthy.

5. pH

pH shows how acidic or basic the water is.

Reef tanks need slightly basic water, close to natural ocean levels.

6. Magnesium (Mg)

This helps keep calcium and alkalinity stable. Corals also use it to grow.

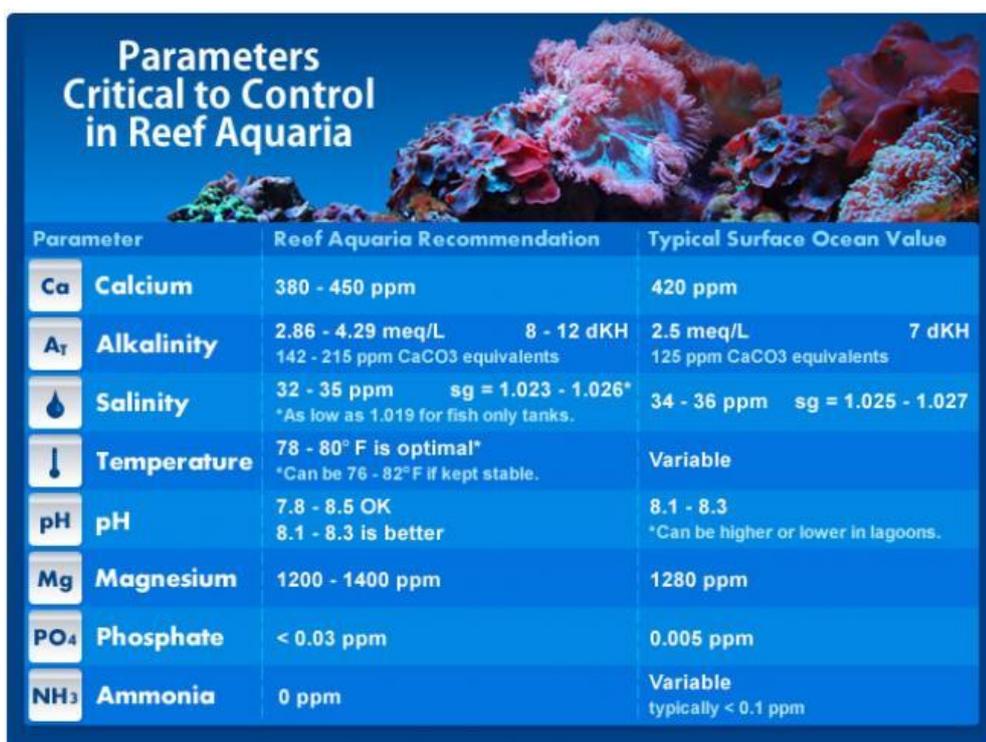
7. Phosphate (PO₄)

In small amounts, it's okay—but too much causes algae blooms, which can smother coral.

8. Ammonia (NH₃)

Ammonia comes from fish poop and old food.

Even tiny amounts are **toxic**. This is why the **nitrogen cycle** matters.



Parameter	Reef Aquaria Recommendation	Typical Surface Ocean Value
Ca Calcium	380 - 450 ppm	420 ppm
A_T Alkalinity	2.86 - 4.29 meq/L 142 - 215 ppm CaCO ₃ equivalents	2.5 meq/L 125 ppm CaCO ₃ equivalents
Salinity	32 - 35 ppm sg = 1.023 - 1.026* *As low as 1.019 for fish only tanks.	34 - 36 ppm sg = 1.025 - 1.027
Temperature	78 - 80° F is optimal* *Can be 76 - 82° F if kept stable.	Variable
pH	7.8 - 8.5 OK 8.1 - 8.3 is better	8.1 - 8.3 *Can be higher or lower in lagoons.
Mg Magnesium	1200 - 1400 ppm	1280 ppm
PO₄ Phosphate	< 0.03 ppm	0.005 ppm
NH₃ Ammonia	0 ppm	Variable typically < 0.1 ppm

Figure 1 - Optimal chemical levels in a tropical reef aquarium.

