

How Does Vital Oxide Work?

Vital Oxide kills bacteria by chemically altering certain amino acids and the RNA in the cell. These amino acids (RNA) are important building blocks in the proteins that help to form the cell walls. When these proteins are destroyed, the cell wall ruptures and the organism dies.

Viruses are eliminated in a different way, by reacting with a peptone, a water soluble substance that originates from the hydrolysis of proteins to amino acids, preventing protein formation. In the chemical reaction, Vital Oxide takes an electron from the amino acid and reverts back to a chlorine ion. The amino acid gives up an electron, which is what chemists call oxidation.

What is Stabilized Chlorine Dioxide (CLO₂)?

While Chlorine Dioxide has Chlorine in its name, the chemistry is radically different than Chlorine. We learn in chemistry that you can mix two compounds to form a third which bears little resemblance to the parents. By mixing two parts Hydrogen and one part Oxygen, water is formed.

The Chlorine Dioxide molecule has one Chlorine atom and two Oxygen atoms. This combination creates a molecular free radical – a magnetic like attraction that seeks out electron donors and selectively oxidizes bacteria and mould. CLO₂ has been recognized for its powerful disinfecting properties since the early 1900's but the product could not be kept shelf-stable, until now with the invention of Vital Oxide©.

The reaction process CLO₂ has on bacteria and other substances takes place in two steps. In Step 1, the CLO₂ accepts an electron and a Chlorite is formed (CLO₃). In the second stage CLO₂ accepts four electrons and forms Chloride (CL⁻). Both of these are oxidizing agents. CLO₂, CLO₃ and CL⁻ all dissociate into sodium chloride – table salt, which is why Vital Oxide is so environmentally friendly.

So what's the main difference between CL and CLO₂?

Unlike Chlorine, CLO₂ produces no chlorinated by-products or carcinogenic compounds (THM and HAAS). When CLO₂ is oxidized by sunlight, it falls apart. Vital Oxide is 100% biodegradable.

CLO₂ has the ability to take on up to 5 electrons, while CL can take on only 2. This makes CLO₂ 2.5 times as effective as CL in absorbing electrons – or as an oxidizing agent. It is also significantly more selective and does not react to many organic compounds like CL does. As a result CLO₂ does not produce environmentally dangerous chlorinated organics. In fact, as CLO₂ is used, the generation of chlorinated organics drops significantly.

Does CLO₂ Work on Pollutants?

Commercial applications have shown that CLO₂ can effectively oxidize many compounds considered to be waste and water pollutants. The following is a list of pollutants CLO₂ has proven effective against:

- Sulphides Aldehydes
 - o Between PH 5 – PH 9 5.2 parts per weight of CLO₂ instantly oxidizes 1 part per weight of hydrogen sulphide
- Reduced Sulphur Compounds
 - o Between PH 5 and 9 a mixture of 5.2 parts by weight of CLO₂ oxidizes hydrogen sulphate instantly
- Nitrogen Compounds
 - o Nitrous Oxide and NO₂ result from fuel burning or metal processes. CLO₂ has been used to scrub these.
- Cyanides
 - o CLO₂ Oxidizes Cyanide into CO₂ and N
- Phenols
- Aldehydes
 - o CLO₂ oxidizes an aldehyde to its corresponding carboxylic acid
 - o Produced in common industrial processes
 - o Photographic industry especially
 - o Formaldehyde can be oxidized into formic acid and then CO₂
- Amines & Mercaptans
 - o Cooking and sanitary processes, feedlots, rendering, petroleum industry
 - o Between PH 5 – PH 9 4.5 parts by weight instantly oxidizes 1 part per weight of mercaptan, and 10 parts per weight oxidizes 1 part amines
 - o These are the harsh smells which CLO₂ immediately destroys
- THM Precursors
 - o Chlorine reacts with these to make both volatile and non-volatile organic substances (THMs)
 - o CLO₂ reacts differently to make them non-reactive for THM production
- Pesticides
 - o In PH > 8 biodegradable herbicides such as paraquat and diquat are eliminated
- Algae / Slime
 - o CLO₂ has shown to be effective in preventing algae growth, more so than copper sulphate
 - o A dose of 1mg/L has been proven to control algae growth