MARICHEM WORLDWIDE MARIGASES SERVICES

CHLORINE TEST KIT FOR SEWAGE WATER TREATMENT

DESCRIPTION

The WT CHLORINE TEST KIT is engineered for the determination of the free Chlorine content in the water systems which expressed in parts per million (ppm). From the test results we could conclude whether the water has been disinfected or not. But why the water must be disinfected? The main reason why water supply systems are chlorinated is to remove pathogens organisms which are also disease causing. The water chlorination is very important in any water system for both human health and environmental protection. Besides removing pathogens water systems are sometimes chlorinated to remove iron, manganese and sulfur compounds, to reduce the color problems and control taste especially in the potable water systems, to control algae and lime for example in the sewage systems.

CONTENTS OF THE TEST KIT

Contents of the test kit are sufficient for 100 tests as many as the number of the sticks which can be found in the metallic package.

ACCESSORIES

1 Test tube with a ring mark of 5ml.
1 Small measuring spoon.
1 Metallic package with 100 test sticks and a color indicator

REAGENTS

1 bottle of 25ml of reagent Solution Chlorine-1
1 bottle of reagent powder Chlorine - 2

HAZARD WARNING

The reagent solution Chlorine – 2 contains 0,3 % Potassium Cyanide solution. According to EU directives is under the following labeling characterization. For further information please read the test kit Material Safety Data Sheet (MSDS)

Keep out of reach of children. Container tightly closed. After contact with skin, wash immediately with plenty of water. When performing the test, do not eat, drink or smoke. If you feel unwell, seek medical advice immediately	**Contains Potassium Cyanide < 0,3%**  **Harmful (Xn)**

A. TEST PROCEDURE (DETERMINATION OF FREE CHLORINE CONTENT Cl_2)

1. Rinse the test tube several times with the test sample and fill it till the mark of 5ml.

2. Measure the pH as the test kit works in a pH<10. If the pH is greater than 10 then you have to adjust it to a value around 6-7. That could be easily done by the addition of some drops of a strong acid such as Sulfuric acid. If the pH is lower than 10 then continue to the step 3.

3. Add one measuring spoon of Chlorine -1 into the water sample.

4. Remove from the metallic package as many sticks as required for measurement and reseal the container after use. Please do not touch the paper zone on the stick.

5. Add 5 drops of the reagent Chlorine – 2 to the water sample and shake it carefully.

6. Immediately place the test stick into the sample solution and let it rest for about 45 seconds.

7. Remove the test stick from the solution and within 10 seconds compare the color of the stick with the color scale on the metallic package. If the free Chlorine is present the colour changes to violet.

B. EVALUATION OF THE TEST RESULT

The free chlorine concentration and the chemical product which must be supplied for the chlorination depend on the kind of the application and on the characteristics of the system but in that point we will be focused on the application of the Chlorination of the ships ballast water.

In the ballast water the transport of pathogens bacterial, algae and crustaceans has become a worldwide problem. The protection of hazardous and coastal areas from the invasion by foreign species is an issue which has not been addressed by local agencies as there has not been a comprehensive policy for damping of ballast water.

Generally a **free Chlorine level of 1mg/lt** is sufficient to ensure that the ballast water is completely sanitized.

The U.S. EPA (U.S. Environmental Protection Agency) requires a residual level of disinfection of water in pipelines to prevent microbial re-growth and protect the treated water in any distribution system. **EPA's maximum residual disinfection levels are 4 mg/lt for Chlorine.**

The chlorine can be applied in several forms in the water: elemental chlorine (chlorine gas), sodium hypochlorite solution (bleach) and dry calcium hypochlorite.

There can be a large amount of mud and sediment in the seawater, in harbours and coastal areas. When used as ballast water the sediments can settle down and lock in the water borne pathogens bacteria, algae and crustaceans. Hypochlorite dosing addressed to this problem as it will quickly transport the free chlorine through the mud and sediments to attack and destroy all the resident marine organisms

Ideally to enhance the sanitizing of sediment within the ballast water tanks the addition of Sodium hypochlorite should commence at the start of the ballast water filling the movement of the ballast water during passage will further enhance sediment treatment

Unlike the industrial plants where low levels of chlorination are necessary for the control of marine growth in pipe heat exchanges and condensers of the cooling water systems, the ballast water may require higher levels of chlorine. This could be some destruction of the native marine ecology when dumping ballast water in

harbours or coastal areas (however in a lot of cases chlorinated ballast water dumping could help the ecological clean up of polluted waters). **In that case it is necessary an application which called de-chlorination for the removal of the free Chlorine from the water.**

C. ADDITIONAL INFORMATION

De-chlorination to a 0-Chlorine residual may be necessary before chlorinate water is dumped so it will not destroy an existing marine ecological system. There are several proven methods to de-chlorinate the ballast water to a 0-Chlorine residual before dumping. The materials used for the de-chlorination are Sulfur Dioxide, Sodium Bisulfite, and Sodium Metabisulfite.

For chlorine measurements test the sample immediately. Chlorine in water is not stable and the concentration will decrease rapidly. Exposure to sunlight or other strong light or agitation will accelerate the reduction of Chlorine.

Free chlorine is most effective at pH of 5 to 7. The effectiveness declines with increased pH. Higher chlorine concentration may be required to ensure adequate disinfection when the pH of water is high. When the pH is from 7-8.5 it is recommended to maintain a chlorine residual of 5 ppm of free chlorine to ensure destruction pathogenic bacteria and viruses for short contact times (5 to 10 minutes).

For more information and literature regarding the water chlorination you may contact our Marichem – Marigases technical department.