Frequently Asked Questions – Drinking Water

Submit your questions to: usn.hampton-roads.navmcpubhlthcenpors.list.nmcphc-drinkingwater@mail.mil

What DPD test do you use for checking chlorine residuals in port? What test do you use while out to sea?

The DPD test is the most widely used colorimetric method used to measure chlorine or bromine residuals in drinking water. The proper DPD test kit or reagent to be used depends on the type of disinfectant used in the water being tested. With the proper reagents, the DPD test can be used to determine disinfectant residuals for free available chlorine (FAC), total chlorine and total bromine.

In Port:

Some shore water systems may utilize hypochlorite (i.e. chlorine) disinfectant, while others may employ chloramines (combined chlorine and ammonia).

- If the disinfectant is hypochlorite, test for FAC using the DPD free chlorine reagent powder pillows following the manufacturer's instructions. The FAC should be at least 0.2 ppm (mg/L).
- If the disinfectant is chloramine, test for total chlorine using the DPD total chlorine reagent powder pillows following the manufacturer's instructions. Total chlorine should be at least 0.5 to 2.0 ppm (mg/L).

At Sea:

Shipboard potable water is disinfected by the addition of sufficient quantities of either chlorine or bromine.

- If the ship's potable water disinfectant is chlorine, test for FAC using the DPD free chlorine reagent powder pillows following the manufacturer's instructions.
- If the disinfectant is bromine, test for total chlorine using the DPD total chlorine reagent powder pillows following the manufacturer's instructions. The total chlorine result is multiplied by 2.25 to give the total bromine residual in ppm (mg/L).
- The FAC or total bromine residual should be at least 0.2 ppm (mg/L) after a 30 minute contact time. The FAC should not exceed 4.0 ppm (mg/L). The total bromine residual (TBR) should not exceed 1.0 ppm (mg/L) at the tap.

Sources:

- NAVMED P-5010-6, Water Quality Afloat
- NMCPHC PPS EH Water Page: Navy Marine Corps Public Health Center - Home

What is halogen residual?

Halogens refers to a group in the periodic table of elements consisting of five chemically related elements: fluorine (F), chlorine (Cl), bromine (Br), iodine (I), and astatine (At). The name halogen means salt producing. Each element in the halogen group is an oxidant. Chlorine is the most common form of water disinfectant worldwide. It is used mainly in the purification of municipal water supplies. Bromine is also used to disinfect drinking water but it is not used in municipal water treatment plants. These disinfectants react with and kill or inactivate microorganisms and contaminants in the water supply. Besides the ability to kill pathogens and oxidize contaminants, a disinfectant must also maintain a concentration (residual) in the water for an extended period of time to account for additional pathogens or contaminants that might be introduced or otherwise present in the potable water supply. This is referred to as a halogen or disinfectant residual.

Maintaining disinfectant residuals throughout the distribution system is used as a barrier against intrusion of bacterial and viral pathogens into distribution systems and as a mechanism to reduce the formation of biofilms and the growth and persistence of free-living pathogens. Disinfectant residuals should be detectable (preferably ≥ 0.2 ppm [mg/L]) but must be below the MRDL (4.0 ppm FAC; 1.0 ppm TBR) throughout the distribution system, including the location representing maximum residence time in the distribution system. The absence of a FAC or TBR in the ship's potable water may indicate contamination and should trigger engineering department follow up action.

Shipboard water is disinfected by the addition of sufficient quantities of chlorine or bromine to produce not less than a 0.2 ppm (mg/L) FAC or TBR concentration after 30 minutes of contact time measured at the potable water tank. The amount of chlorine or bromine required to produce a FAC or TBR of not less than 0.2 ppm (mg/L) after 30 minutes of contact can vary widely because of high disinfectant demand, water temperature and other factors. A disinfectant residual of 0.2 ppm (mg/L) FAC or TBR throughout the distribution system is the desired operational parameter and public health goal.

Source:

- NAVMED P-5010-6, Water Quality Afloat

Should I conduct water testing and inspections if we are on a barge?

Barges fall into the category of yard craft. They have no water producing capability. The barge may have a potable water storage tank and a limited distribution system, but potable water is received from the shore facility. Disinfection of the water is not necessary when water is transferred from an approved potable water source. Most problems associated with contamination of water aboard yard craft are usually the result of improper transfer procedures

or infrequent flushing of holding tanks. Yard craft should establish a frequent flushing planned maintenance action to prevent stagnant water in holding tanks.

Although disinfection of yard craft potable water is not required under normal operating conditions, Medical Department personnel attached to the shipyard or the cognizant MTF, group or squadron are responsible for oversight of potable water quality and sanitation. Water testing requirements and periodicity are established and promulgated by the organization to which the craft is assigned and must be sufficient to safeguard against water quality problems.

Source:

- NAVMED P-5010-6, Water Quality Afloat

What is Preventive Medicine's role in water quality testing on-base if the water comes from the city's treatment plant and distribution system?

Per BUMEDINST 6240.10 (series), the installation preventive medicine authority (PMA) provides public health advice and consultation to the installation Commanding Officer (ICO) and Naval Facilities Engineering Command (NAVFAC) on health aspects of drinking water quality. One important aspect of the installation PMA's role is to develop, maintain and execute a public health drinking water surveillance plan. Public health surveillance of drinking water quality provides checks and balances to the installation water quality compliance program. It is for surveillance only and not intended to replace compliance monitoring that is required by Federal and State regulations, which is the responsibility of NAVFAC Public Works Department.

Source:

- BUMEDINST 6240.10C, Department of the Navy Medical Drinking Water Program
- NAVMED P-5010-5, Water Quality for Shore Installations