

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Lejeune, NC 28542-0042

FMST 201

Perform Water Purification for Individual Use

TERMINAL LEARNING OBJECTIVES

1. Given water and hygiene items, **perform individual field hygiene** to prevent injuries, maintain health and preserve the fighting force to accomplish the mission. (HSS-MCCS-2024)

ENABLING LEARNING OBJECTIVES

1. Without the aid of reference, given a description or list, **identify sources of water in a field environment**, within 80% accuracy, in accordance with NAVMED P-5010 Manual of Naval Preventive Medicine. (HSS-MCCS-2024a)
2. Without the aid of reference, given a description or list, **identify factors affecting sources of water**, within 80% accuracy, in accordance with NAVMED P-5010 Manual of Naval Preventive Medicine. (HSS-MCCS-2024b)
3. Without the aid of reference, given a description or list, **identify the procedures for water purification for individual use**, within 80% accuracy, in accordance with NAVMED P-5010 Manual of Naval Preventive Medicine. (HSS-MCCS-2024c)
4. Without the aid of reference, given a description or list, **identify water testing requirements**, within 80% accuracy, in accordance with NAVMED P-5010 Manual of Naval Preventive Medicine. (HSS-MCCS-2024d)

OVERVIEW

Safe water, in sufficient quantities, is essential. Insufficient quantity or quality of water is not only debilitating to the individual but will have a significant impact on unit operational readiness. Water that is not properly treated and disinfected can spread bacterial diseases such as cholera, shigellosis, typhoid, and paratyphoid fever. Untreated water can also transmit viral hepatitis, gastroenteritis and parasitic diseases such as amoebic dysentery, giardiasis and schistosomiasis. All personnel must be familiar with and follow proper water discipline. This includes drinking only water that has been properly treated, protected, and distributed. Every individual is responsible for ensuring that potable water does not become contaminated from careless or improper handling and being vigilant for the protection of a water supply from intentional or unintentional attack.

1. WATER SOURCES AND CHARACTERISTICS

Water may be obtained from various sources in the field to include the following:

Salt Water is considered the best source of water, if accessible, due to the fact that it is generally less contaminated than other sources and there is an unlimited supply. When considering salt water, however, the water must be desalinated and disinfected before it is used. This requires the use of a reverse osmosis water purification unit (ROWPU). Salt water cannot be purified for individual use.

Ground Water is water procured from wells and springs. Ground water is generally less susceptible to chemical and biological pollution than other sources and is considered the best source of water during an NBC attack. The quantity and quality may be hard to determine without proper equipment. Adequate disinfectant is required. Ground water may or may not be used for individual use, depending on its accessibility.

Surface Water is water procured from lakes, rivers, streams, and ponds. Moving or large bodies of water are generally considered less contaminated due to the aeration which significantly decreases growth of bacteria, algae, and fungus. Of the sources of water, surface water is the easiest to procure for individual use due to it being readily accessible. Adequate disinfectant is required.

Rain Water is water procured from rain, snow, or ice. This source should only be used when other sources of water are not available. It is not considered a reliable source due to the fluctuation in annual rainfall which results in inadequate quantities. Adequate disinfectant is required.

2. FACTORS AFFECTING SOURCES OF WATER

Water Quantity - the source should provide an adequate supply of potable water for all personnel for the expected length of stay.

Water Quality - water source should be free of significant contamination such as sewage, naturally occurring toxic elements and any NBC warfare agents. The water should not be objectionable due to turbidity, color, odor, or taste. Ensure source is protected from possible organic contamination by sewage fallout or runoff from latrines, showers, motor pools, etc. Water temperature is also a factor. Warm water is not palatable and cool water retains chlorine longer.

Accessibility - the water source should be accessible and able to be treated with available resources.

3. **PROCEDURES FOR INDIVIDUAL WATER PURIFICATION**

Types of Water Containers

Canteen - intended for individual use. Typical issued canteen is 1 quart but can also come in a 2 quart size.

Jerry Can - 5 gallon container that must be labeled "Potable Water Only" if used for drinking water since they have various uses.

Lyster Bag - 36 gallon hanging bag used for hand washing.

Water Bull - 400 gallon insulated mobile potable water container that provides easily accessible water to troops.

Iodine tablets - Iodine tablets are no longer issued in the IFAK. However, if you have them and you need to use them, you must know how. They are intended to disinfect water contained in small containers such as canteens or water jugs. The tablets are subject to deterioration in storage. They must be inspected for signs of physical change before they are used; otherwise, they may not disinfect the water. Iodine tablets that are completely yellow or brown, that stick together, or crumble easily are no longer effective and must not be used. Iodine tablets in good condition will be solid and steel gray in color. The procedures for disinfecting small quantities of water with these tablets are as follows:

Water in canteens

- (1) Fill the canteen with the cleanest, clearest water available.
- (2) Add two iodine tablets to each 1-qt canteen full of water, or four tablets to 2-qt canteens. Tincture of iodine, 2 percent, may be used in place of the tablets. Five drops of the liquid are equivalent to one iodine tablet.
- (3) Put the cap on the canteen. Shake the canteen to dissolve the tablets.
- (4) Wait 5 min, loosen the cap slightly and tip the canteen over to allow leakage around the canteen threads.
- (5) Tighten the cap and wait an additional 25 min before drinking.

Personal hydration systems

- (1) Use four iodine tablets for 70 to 72 ounce water reservoirs and six for 100 to 102 ounce reservoirs.
- (2) Allow 30 min of contact time before drinking the water.

Chlorine bleach - Household bleach is normally a 5 percent chlorine solution.

- (1) Add two drops of bleach per quart of water to be disinfected and let it stand for 30 min before drinking. If a dropper is not available, wet a cloth or stick with bleach and allow it to drip into the water.

(2) Use four drops for a 70-oz reservoir, and six drops for the 100-oz reservoir. Mix the added bleach in the reservoir water and let it stand for 30 min before drinking it.

Micropur - the next generation of chemical water treatment. It's safer than iodine tablets and has no unpleasant taste. It is the only disinfectant system currently available that is effective against Cryptosporidium and viruses. Micropur tablets are the only water purification tablets issued in the IFAK.

Water in canteens

- (1) Fill the canteen with the cleanest, clearest water available.
- (2) Add one tablet to 1-qt canteen full of water
- (3) Put the cap on the canteen. Shake the canteen to dissolve the tablet.
- (4) Wait 5 min, loosen the cap slightly and tip the canteen over to allow leakage around the canteen threads.
- (5) Allow 30 min of contact time before consuming for clear water; 4 hours for cold or cloudy water.

Personal hydration systems

- (1) Use two tablets for 70 to 72 ounce water reservoirs and three for 100- or 102-oz reservoirs.
- (2) Allow 30 min of contact time before consuming for clear water; 4 hours for cold or cloudy water.

Boiling - this method should only be used in **emergency** situations and only with small quantities of water, i.e. canteen cup. Bringing the water to a vigorous boil for five minutes will kill pathogens such as Giardia and E. coli. This method does not provide for residual disinfectant capabilities and should not be used to store large quantities of water.

4. **WATER TESTING**

Frequency

- All bulk water supplied to personnel for drinking must be tested daily for Free Available Chlorine (FAC). FAC is the portion of the total chlorine remaining in chlorinated water that will react chemically with undesirable or pathogenic organisms.
- Perform weekly bacteriological testing.

Procedure for daily testing

- Add 1 DPD #1 (Diethylphenylene Diamine) tablet to water sample.
- Shake gently until tablet is dissolved.
- Use color comparator to determine the FAC.

Range

- 2.0 -5.0 ppm FAC for field water supplies

REFERENCES

Manual of Naval Preventive Medicine, NAVMED P-5010

Water Purification Review

1. List the three factors associated with selecting a water source.
2. Of the four sources of water, which is best suited for individual use?
3. What are the drawbacks to using boiling as a method of decontamination?
4. What is the total time needed to disinfect one standard canteen of water using Micropur tablets?