

Test Kit for Measuring Free Chlorine in Water will be Available from the Feed and Environmental Water Laboratory of the University of Georgia

-Prepared by Uttam Saha and Laura Daniel

Background

Chlorine added to water kills almost all water-borne bacteria and some viruses. Thus, chlorination is a common practice to eliminate microbial contamination of drinking water.

We receive a considerable number of phone calls from county offices seeking a test for chlorine in water, but we cannot offer this test because water samples for this test have a very short (15 minutes) regulatory holding time. Therefore, this test must be performed when the water sample is taken. There are several chlorine test kits available in stores and online. One of them is SenSafe, an EPA-approved kit shown below. It comes in a plastic bottle with 50 test strips and each test requires one strip.



Features of the chlorine test kit

- ✓ USEPA Approved
- ✓ Number of tests: 50 samples can be tested.
- ✓ Test Time: 40 seconds
- ✓ Measures: 0 to 6 ppm (mg/l)

Applications for the test kit include the following:

a. City or County Water: A client may believe that too little or too much chlorine is present in their water.

b. Private Drinking Water Wells:

- After shock chlorination, clients need to remove all of the chlorine from the water before retesting or using. Oftentimes, clients want to know how they can tell when all of the chlorine is removed.
- With a chlorination unit in place, clients often want to know whether the unit is adding too little, optimum, or excess chlorine to the water.

Interpretation

1. **Too Little:** minimum 0.5 ppm expected; <0.2 ppm is microbiologically unsafe and indicates the possible presence of water-borne pathogens
- 2) **Too Much:** >4 ppm imparts unpleasant taste and/or odor and causes irritation to the tongue and eyes.

Availability, Distribution, and Cost

- The county extension offices may purchase the test kit with instructions including a step-by-step test protocol from the Feed and Environmental Water Laboratory (FEWL) and make them available for public at a nominal cost like FEWL (as described below).
- The FEWL will also lend the kit directly to clients living near Athens. The suggested price for the clients to borrow and perform *up to two tests per occasion* is 3 dollars.
- The FEWL will receive a \$3 check for the testing fee as well as a refundable check of \$25 as a deposit from clients who borrow the kit with *two test strips*. The lab will ask clients to return the kit intact within 3 business days. The deposit check of \$25 will be returned to the clients upon return of the kit.

Technical Information

Free chlorine in water exists as: dissolved chlorine gas (Cl_2), hypochlorous acid (HOCl), and/or hypochlorite ion (OCl^-). *Free chlorine* is defined as the concentration of residual chlorine in water after performing its germicidal role. Free chlorine forms chloramines by combining with ammonia or it may form organic chloramines by combining with organic amines. Inorganic and organic chloramines are called *combined chlorine*. *Free chlorine* plus *combined chlorine* make up the total chlorine in water.

The germicidal strength of different forms of chlorine in water is ranked as follows: $\text{Cl}_2 > \text{HOCl} > \text{OCl}^- > \text{inorganic chloramines} > \text{organic chloramines}$. Although inorganic chloramines are weaker disinfecting agents, they are more stable than free chlorine and can provide disinfection over long exposure periods. However, because ammonia and inorganic amines are at low concentrations in drinking water, measuring the *free chlorine* will represent its safety for drinking and other purposes.

**University of Georgia
Feed and Environmental Water Laboratory
2300 College Station Road
Athens, GA 30602
706-542-7690**



Instructions for SenSafe™ Free Chlorine Water Check

Step 1: Dispense room-temperature water into provided cup. Fill to the 2 oz line. *Notation: Perform test within 15 minutes of dispensing the water.*

Step 2: Dip one test strip into the water sample for 20 seconds. Provide a constant, gentle, back and forth motion with 1 inch to 2 inch strokes that maximize the liquid flow through the indicator pad.

Step 3: Remove the strip and shake once briskly to remove excess water.

Step 4: Wait for 20 seconds.

Step 5: Fold the white plastic handle of the test strip under the indicator pad so it provides a uniform viewing background. Match indicator pad to the appropriate color from the color chart on the bottle.

Step 6: If the color chart reading exceeds 2.6 mg/L, dilute the sample as described below and retest with steps 1-5.

- If the color reads between 2.6 and 4.0, see **example #1** below for dilution instructions.
- If the color reads 4.0 or higher, start with **example #2** for dilution instructions.
- If the dilution from **example #2** does not provide a reading of 2.6 or lower, please call the lab at 706-542-7690 for additional instructions.

Example dilutions:

#1 - Dispense water into provided cup and fill to the 1 oz line. Add water from a non-chlorinated source (e.g. distilled water) and fill to the 2 oz line. Multiply the number from the color chart by 2 to obtain the actual chlorine concentration in mg/L.

#2 – Dispense water into provided cup and fill to the ½ oz line. Add water from a non-chlorinated source (e.g. distilled water) and fill to the 2 oz line. Multiply the number from the color chart by 4 the actual chlorine concentration in mg/L.

Special Notation: If this test is required for compliance monitoring, please request ITS method D99-003 [Revision 3, November 21, 2003] in EPA format.