

0.05–2.00 mg/L Cl₂

TNTplus[®] 867—Method 10231/10232

Scope and application: For drinking water, wastewater and pool water.



Test preparation

Reagent storage

Storage temperature: 2–8 °C (35–46 °F)

pH/Temperature

The pH of the water sample must be between pH 3–10.

The temperature of the water sample and reagents must be between 15–25 °C (59–77 °F).

Before starting

Samples must be analyzed immediately after collection and cannot be preserved for later analysis.

The water samples must not be pipetted, as this can cause gas stripping losses.

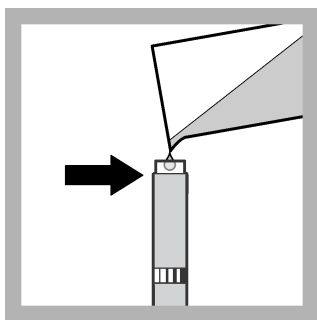
To sequentially measure free and total chlorine, complete the free chlorine procedure, then start the total chlorine procedure at **step 2** and leave off **steps 5+6**.

Review safety information and expiration date on the package.

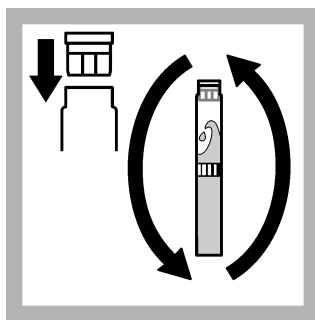
Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.

Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

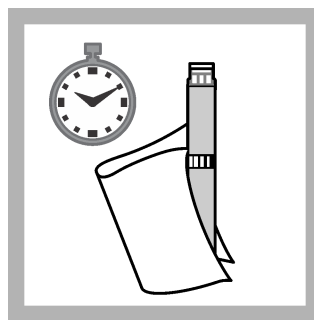
Procedure—Free chlorine



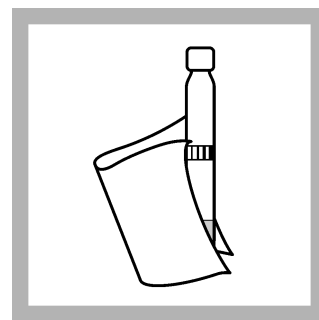
1. Fill the vial with the sample to approximately **1 cm (0.39 in)** below the opening of the vial.



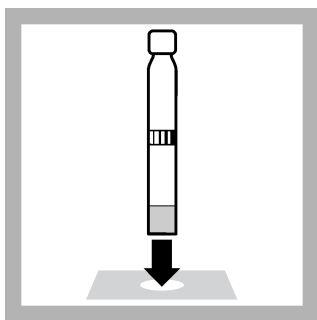
2. Close the vial. Carefully invert the vial a few times (**do not shake**) and rotate it slightly to remove any bubbles sticking to the sides.



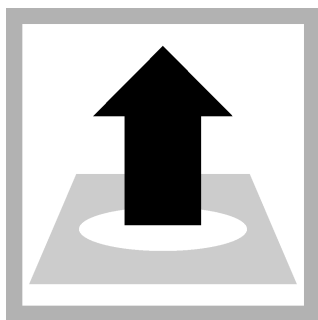
3. After **1 minute**, thoroughly clean the outside of the vial.



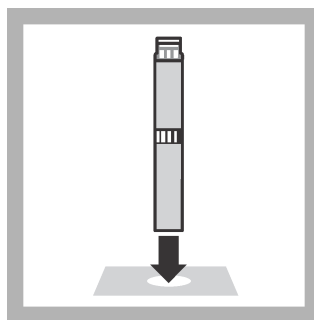
4. Thoroughly clean the outside of the **zero-vial**.



5. Insert the **zero-vial** into the cell holder.
DR1900: Go to LCK/TNTplus methods. Select the test, push **ZERO**.

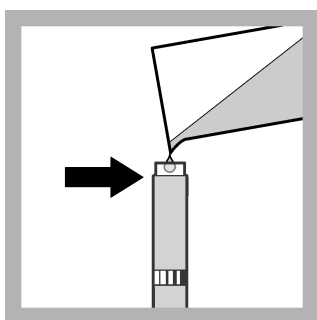


6. Remove the zero-vial.

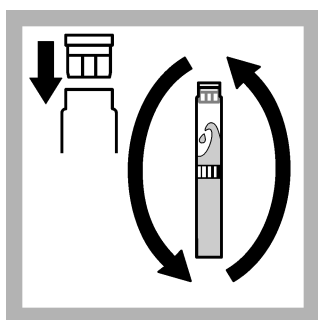


7. Insert the **sample-vial** into the cell holder.
DR1900: Push **READ**.

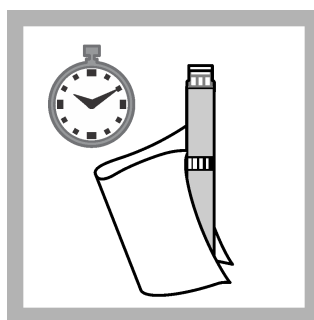
Procedure—Chlorine free and total



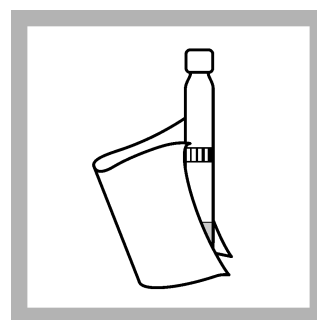
1. Fill the vial with the sample to approximately **1 cm (0.39 in)** below the opening of the vial.



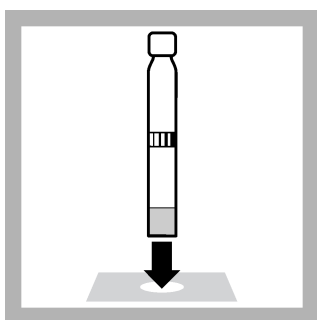
2. Close the vial. Carefully invert the vial a few times (**do not shake**) and rotate it slightly to remove any bubbles sticking to the sides.



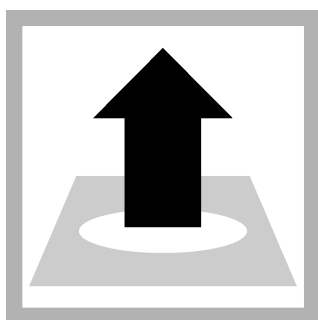
3. After **1 minute**, thoroughly clean the outside of the vial.



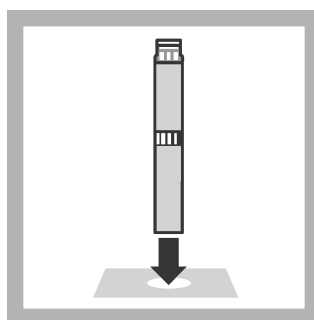
4. Thoroughly clean the outside of the **zero-vial**.



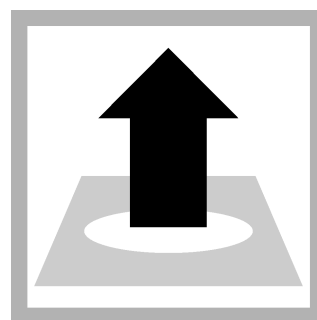
5. Insert the **zero-vial** into the cell holder.
DR1900: Go to LCK/TNTplus methods. Select the test, push **ZERO**.



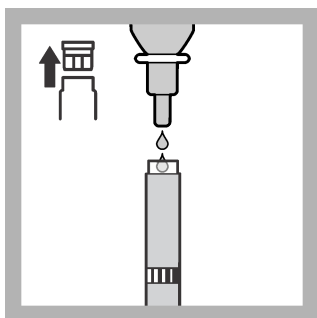
6. Remove the zero-vial.



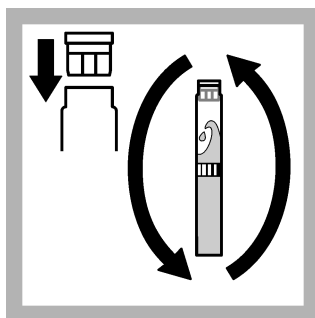
7. Insert the **sample-vial** into the cell holder.
DR1900: Push **READ**. Free Chlorine is measured.



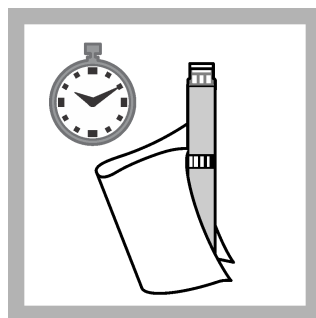
8. Remove the vial.



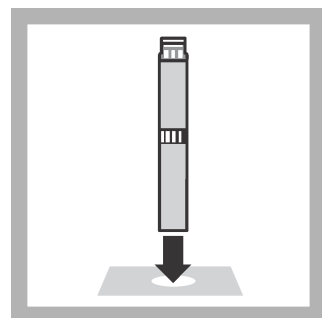
9. Open the vial. **Immediately** add 1 drop of solution A.



10. Close the vial. Carefully invert the vial a few times (**do not shake**) and rotate it slightly to remove any bubbles sticking to the sides.

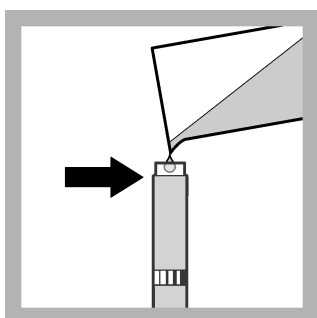


11. After 3 minutes, thoroughly clean the outside of the vial.

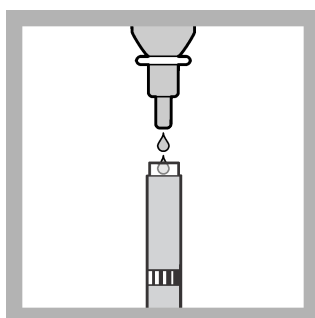


12. Insert the vial into the cell holder. DR1900: Push **READ**. Total chlorine is measured.

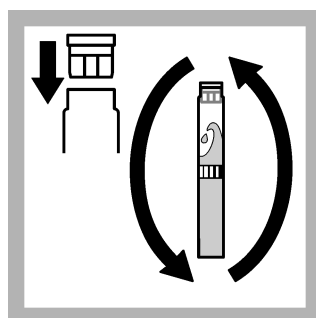
Procedure—Total chlorine



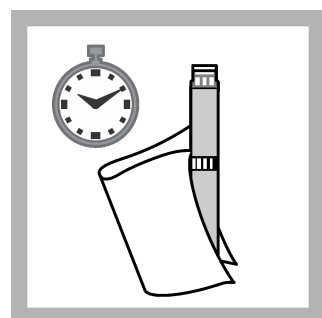
1. Fill the vial with the sample to approximately 1 cm (0.39 in) below the opening of the vial.



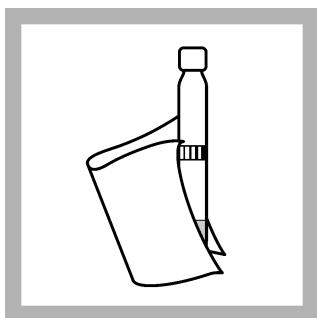
2. **Immediately** add 1 drop of solution A.



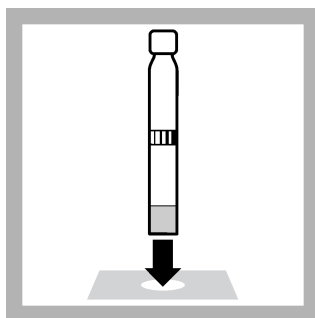
3. Close the vial. Carefully invert the vial a few times (**do not shake**) and rotate it slightly to remove any bubbles sticking to the sides.



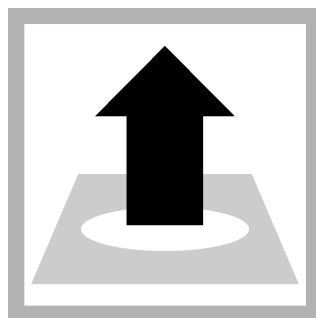
4. After 3 minutes, thoroughly clean the outside of the vial.



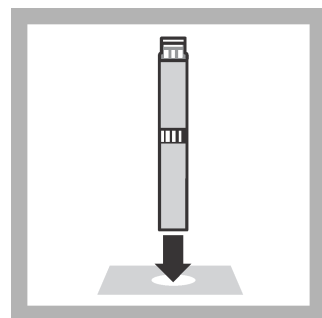
5. Thoroughly clean the outside of the **zero-vial**.



6. Insert the **zero-vial** into the cell holder. DR1900: Go to LCK/TNTplus methods. Select the test, push **ZERO**.



7. Remove the zero-vial.



8. Insert the **sample-vial** into the cell holder. DR1900: Push **READ**. Total Chlorine is measured.

Interferences

High-Bias Results: All oxidizing agents, e.g. ozone, iodine, chlorine dioxide, manganese dioxide, chromate are also determined (refer to [Before starting](#) on page 1).

Low-Bias Results: A large excess of oxidizing agents (outside the measuring ranges given above) can cause result displays within the measuring range.

The measurement results must be subjected to plausibility checks (dilute and/or spike the sample).

Summary of method

Free chlorine reacts with diethyl-p-phenylenediamine (DPD) to form a red dye.

TNT^{plus}



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