	KATHMANDU UPATYAKA KHANEPANI LIMITED	No.
	STANDARD OPERATING PROCEDURE	
	RESIDUAL CHLORINE HACH DR300	Effective Date: Revision No: 00

1. Scope

To provide a standard operating procedure for determining the free residual chlorine of water samples following Standard Methods.

2. Principle

Free residual chlorine in tap water is an important index to assess the effect of disinfection. Decided concentration of free residual chlorine (more than 0.2 mg/L) in tap water ensure the biological safety of tap water.

3. Interference

- Acidity: More than 150mg/L $CaCO_3$. The full color may not develop, or the color may fade instantly. Adjust to pH 6-7 with 1N Sodium Hydrochloride.
- Alkalinity: More than 250 mg/L $CaCO_3$. The full color may not develop, or the color may fade instantly. Adjust to pH 6-7 with 1N Sodium Hydrochloride.
- Monochloramine: Causes a gradual drift to higher readings.
- Manganese, Chromium: Abnormal coloration (Positive interference).

4. Sampling and Preservation

- Collect samples in clean glass bottles.
- Analyze the samples immediately. The samples cannot be preserved for later analysis.
- Chlorine is a strong oxidizing agent, and it is unstable in natural water.

5. Equipment /Apparatus

- DR300 Spectro meter
- Sample cell (10mL)
- Soft tissue

6. Reagents

- DPD reagent for free residual chlorine

Order information.

Item: DPD Free Chlorine Reagent Powder Pillow, 10mL

Order code: 2105569

7. Procedure

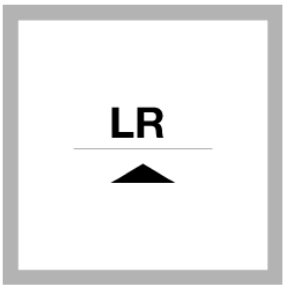
Measurement is done by following procedure.

(1) Preparation of sample cell

- Fill sample with given volume: Refer marked line on sample cell
- Wipe surface of sample cell before measurement.

(2) Measurement

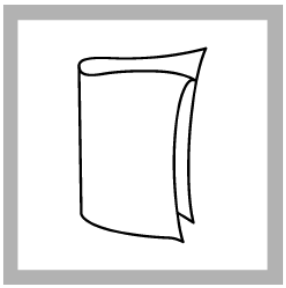
- Implement measurement operation according to the procedure below.
- Measurement should be done at least 2 times for one sample. Implement two (2) times of measurements on a single sample and evaluate the results using the average value.



1. Set the instrument to low range (LR).

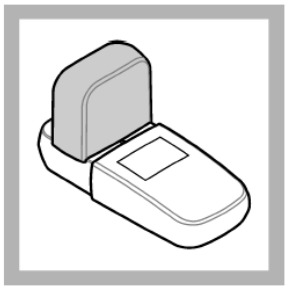
For DR300, push the up arrow button. For PCII, push the menu button, checkmark button, then the menu button again.

2. Prepare the blank: Rinse a sample cell and cap three times with sample. Fill the sample cell to the 10-mL mark with sample. Close the sample cell.



3. Clean the blank sample cell.

4. Insert the blank into the cell holder. Point the diamond mark on the sample cell toward the keypad.



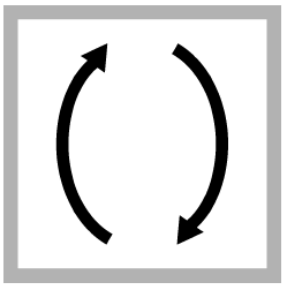
5. Install the instrument cap over the cell holder.

6. Push **ZERO**. The display shows "0.00".

7. Remove the sample cell from the cell holder.

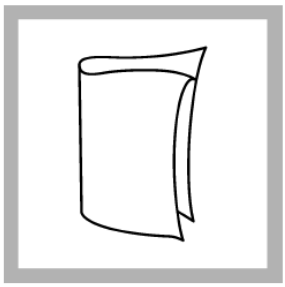
8. Prepare the sample: Rinse a second sample cell and cap three times with sample. Fill the sample cell to the 10-mL mark with sample.

9. Add one 10-mL DPD Free Chlorine Reagent Powder Pillow or one 10-mL DPD Total Chlorine Reagent Powder Pillow to the second sample cell.



10. Close the sample cell. Invert the sample cell for about **20 seconds** to dissolve the reagent. Undissolved power will not affect accuracy.

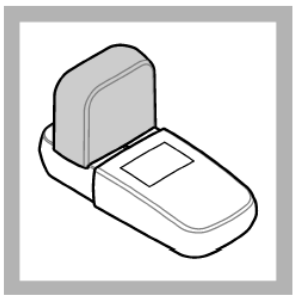
A pink color will show if chlorine is in the sample.



11. Clean the prepared sample cell.

12. Free chlorine measurement: Within 1 minute of the reagent addition, insert the prepared sample into the cell holder. Point the diamond mark on the sample cell toward the keypad.

Go to step 15.



15. Install the instrument cap over the cell holder.

16. Push **READ**. Results show in mg/L Cl_2.

17. Immediately empty the sample cell. Rinse the sample cell and cap three times with deionized water.

8. Data quality management and data reporting.

- Calculate RPD value and check the data precision.

RPD= (Max. value – Min. value) / Average x 100 (%)

- If RPD value exceeds 10%, measure one more time (the 3rd measurement).

- Select two (2) data that are close and recalculate RPD
- If RPD value exceeds 10%, measure one more time (the 4th measurement).
  ***Note*:** If RPD value remains large, suspect contamination of sample cell and clean sample cell.

➢ Calculate average value using the data set (two (2) datas) that satisfies RPD value < 10%.

➢ Calculated average value using data set which satisfies RPD <10% is reported as the measurement value.

9 Daily maintenance

- Cleaning sample cell after use.

1. Clean the inside and outside of the cells and caps by washing with a laboratory glass cleaning detergent. Follow with multiple rinses with distilled or demineralized water.

Written by:		Signature/Date:
Reviewed by:		Signature/Date:
Approved by:		Signature/Date: