

STABILISATION PROCEDURE OF SODIUM HYPOCHLORITE (EQUIVALENT TO 6g/L ACTIVE CHLORINE) PRODUCED BY WATA®



- ⚠ This operating method is set up for people qualified for laboratory work.
- ⚠ The WataTest® cannot be used for stabilized sodium hypochlorite.
- ⚠ To test the concentration, we recommend using the titration of sodium thiosulfate method.
- ⚠ **Once stabilized with caustic soda, the solution of sodium hypochlorite:**
 - ▶ Cannot be used as Dakin's solution for wound cleaning (the excessive alkalinity can cause burning).
 - ▶ Must be kept in a closed receptacle, protected from light and in the coolest possible place.
 - ▶ Has a higher pH. We recommend that it should not be used for disinfection.
- ⚠ **This protocol covers two distinct operations: preparing the caustic soda solution, then stabilizing it and checking the pH.**

1. DAILY PREPARATION OF THE 5 MOL/L CAUSTIC SODA (NAOH) SOLUTION

EQUIPMENT

- ▶ One weighing scale with minimum 500 g capacity, precision ± 1 g
- ▶ One graduated liquid receptacle
- ▶ One plastic bottle to store the solution (the use of plastic PET bottles is not recommended)
- ▶ One funnel with a diameter of less than 1 cm.
- ▶ Caustic soda (NaOH) of minimum 99% purity, purchased in a sealed packet.

SECURITY MEASURES



- ⚠ Contact with skin and eyes is dangerous and harmful to health.
- ⚠ The use of protective goggles or a face mask and gloves is recommended.
- ⚠ In case of contact with eyes, rinse profusely with clean water for several minutes and contact a doctor.
- ⚠ In case of contact with skin, rinse with plenty of clean water for several minutes.
- ⚠ Caustic soda solution should not be stored because it becomes inactive when exposed to air.
- ⚠ The reaction of caustic soda with water is exothermic. It is mandatory to add the caustic soda to the water solution or the sodium hypochlorite solution, never the other way round. Carry out the operation slowly (drop by drop).

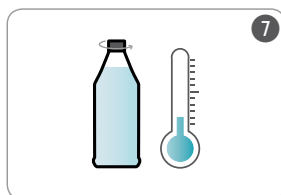
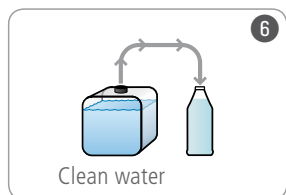
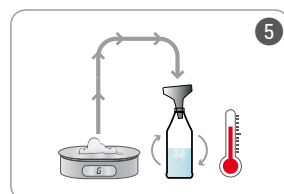
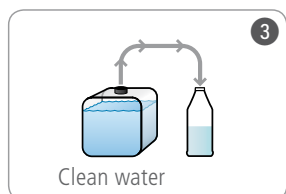
METHOD

- 1 Before starting, identify the quantity of caustic soda solution to be prepared using table 1.

TABLE 1 QUANTITY OF CAUSTIC SODA TO BE PREPARED

Quantity of sodium hypochlorite at 6g/L to be stabilized (L)	Clean water	Caustic Soda NaOH
<=1 L	50 mL	10 g
2 L	100 mL	20 g
15 L	250 mL	50 g
30 L	500 mL	100 g
60 L	1000 mL	200 g

- 2 Put on safety goggles and thick plastic gloves!



- 3 Half-fill a one-litre bottle with clean water (degree of turbidity less than 5 NTU*). If you do not have any clean water, it must be filtered.
- 4 Weigh out the caustic soda needed according to Table 1.
- 5 While stirring, carefully pour the soda into the half-filled bottle using the funnel, taking care to avoid splashing. The temperature will rise. If the bottle becomes too hot, close it and place it in a bucket of cool water.
- 6 Top up to 1 L with water and wait for complete dissolution while stirring.
- 7 Close the bottle and leave it to cool.

* NTU define the cloudiness of water (NTU = nephelometric turbidity unit.
NTU < 5= clean water
5 < NTU < 30 water slightly cloudy

**⚠ For safety reasons, write on the bottle:
5 mol/L caustic soda (NaOH) solution
DANGER – CORROSIVE**

⚠ Never leave the bottle within the reach of children!

**⚠ The caustic soda solution must be used within a day of production, otherwise it will become becomes inactive the following reaction: $\text{NaOH} + \text{CO}_2 \rightarrow \text{NaHCO}_3$
This reaction takes place if the solution is exposed to air or is in an incompletely filled container.**

2. STABILISING A BATCH OF WATA®-PRODUCED SODIUM HYPOCHLORITE USING A PH METER (RECOMMENDED, ACCURATE METHOD)

The stabilization method needs the measurement of the solution's pH. We recommend using a pH meter (precision equipment). If you do not have a pH meter, use pH paper. However, it is essential to use precise pH paper with a range of 10-13.

2.1 CALIBRATING THE PH METER EQUIPMENT

- ▶ one pH meter
- ▶ pH 7 and pH 10 calibration solutions
- ▶ one 50 to 100 mL receptacle
- ▶ distilled or demineralised water

⚠ Calibrating the pH meter: Calibrate the pH meter before each measurement exercise with two buffer solutions (unless otherwise indicated by the manufacturer). Calibrate the pH meter with a pH 7 solution and then a pH 10 solution for measurements in a basic medium.

⚠ Measurement and storage of the probe: After each measurement, rinse the pH probe briefly in purified water (e.g. demineralised, deionised or distilled water). Once the exercise is completed, rinse the probe then quickly immerse it in the storage liquid recommended by the manufacturer.

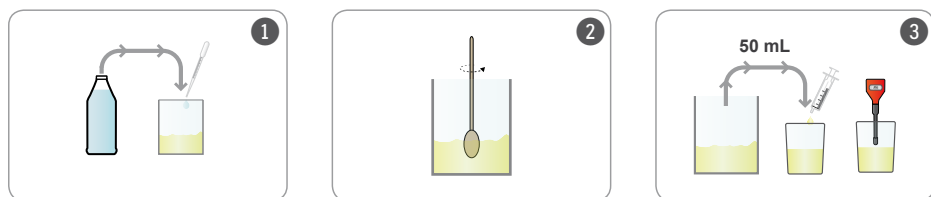
⚠ A probe which is improperly stored and/or calibrated will provide inaccurate measurements and will consequently result in an unreliable solution.

2.2 STABILIZATION

EQUIPMENT

- ▶ One calibrated pH meter or precise pH test strips
- ▶ One graduated thermometer (0°C to 100°C)
- ▶ One batch of 5 mol/L caustic soda solution, prepared as described in the previous section
- ▶ One 50 mL syringe or one graduated cylinder (100 mL) according to the quantity of hypochlorite to be stabilized
- ▶ One spatula or wooden broom handle cut in half or other clean stirring tool (never metallic)
- ▶ One 50 mL beaker

METHOD



- 1 Use your WATA-produced sodium hypochlorite solution - equivalent to 6 g/L active chlorine - and make sure its temperature is stable and close to the the ambient temperature of the room (check the temperature using a thermometer before starting the stabilization). Add the required volume of 5 mol/L (=200 g/l) caustic soda NaOH (refer to Table 2 below) with a syringe or a graduated cylinder.

TABLE 2: QUANTITY OF THE SODA SOLUTION 5M TO BE ADDED ACCORDING TO THE QUANTITY OF SODIUM HYPOCHLORITE TO BE STABILIZED.

Quantity of sodium hypochlorite (6g/L) to be stabilized (L)	Caustic soda dose to be added
<=1 L	1 mL
2 L	4 mL
15 L	30 mL
30 L	60 mL
60 L	120 mL

- 2 Stir with a spatula, broom handle or other clean, non-metallic stirring tool until thoroughly mixed.
- 3 Take 50 mL of this solution, using a syringe. Measure the pH with the pH meter or precise pH 10-13 test strips, shaking the solution gently. The sample must be at the same temperature as the calibration solution.
Note: after the pH measurement, you can pour the 50 mL sample back into the solution of sodium hypochlorite to be stabilized.
- 4 If the pH is below 11.8, repeat steps 1 to 3 by adding further doses (less than half of the quantities indicated in table 2) with the syringe until the pH is between 11.8 and 12. Stir before each pH measurement.
- 5 If the pH is between 11.8 and 12, confirm the pH measurement by repeating step 3 twice.
- 6 Record in the lab book the pH and the amount of caustic soda solution added. Conditions will vary greatly from one batch to another and also depending on the carbonatation of the NaOH solution used. **The amount of NaOH to be added must therefore be assessed on a case by case basis.**
- 7 Bottle the stabilized solution quickly, sealing the bottles.

⚠ If you use the entire soda solution before achieving the pH of 11.8, prepare a further small amount of soda according to table 1. If this occurs systematically, this indicates that you are using poor quality soda.

ANTENNA FOUNDATION

Av. de la Grenade 24
CH-1207 Geneva
T: +41 22 737 12 40
Email : wata@antenna.ch

WWW.ANTENNA.CH

