

## How to make Chlorine Dioxide in Solution CDS

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### **NOTE:**

CDS (the chlorine dioxide gas in solution) is not very stable. An unopened bottle will only keep in the fridge for about 6 months. So, some people prefer to make their own CDS using the raw materials – sodium chlorite (about 25%) and hydrochloric acid (4%).

Kalcker's protocols use CDS at 3000 ppm. COMUSAV recommends <http://www.mmsmineralshop.com/>

Others using CDS provided these links on forums:

<https://kvlab.com/chlorine-dioxide-products/cds-aqueous-chlorine-dioxide-3000-ppm.html>

[CDS /Chlorine Dioxide Solution Water Purification Drops - 100ml | EClO2](#)

These notes are based on the video demonstration by Andreas Kalcker: [How to make CDS ? with Andreas Kalcker \(lbry.tv\)](#)

### AIM

1. To prepare 3000 ppm (0.3%) concentration of Chlorine Dioxide in Solution (CDS)
2. To check the concentration of CDS (not noted here).

### Apparatus

1. Glass jar with close fitting glass lid (like a Kilner jar) but with NO METAL parts.
2. Smaller tall glass container to fit inside the jar

### Materials

1. Sodium Chlorite ( $\text{NaClO}_2$ ) @ 25%, 24.5%, or 22.5% or even 28% solution  
- this is NOT bleach ( $\text{NaClO}$ )  
<https://kvlab.com/chlorine-dioxide-kit-w-hcl-activator-NKP-H4>  
Note: kvlabs will not post their products overseas! Mmsmineralshop have yet to reply to my queries. So, I used Life Systems Chlorine Dioxide in Liquid form which is only 2.9% sodium chlorite. [https://www.lifesystems.co.uk/products/water-purification/chlorine-dioxide-drops?msclkid=90a278228d461202350218ad53b127f3&utm\\_source=bing&utm\\_medium=cpc&utm\\_campaign=LS%20Shopping%20MM%20-%20Bing&utm\\_term=4576648439883566&utm\\_content=PL%20-Lifesystems%20%3E%20Everything%20Else%20MM](https://www.lifesystems.co.uk/products/water-purification/chlorine-dioxide-drops?msclkid=90a278228d461202350218ad53b127f3&utm_source=bing&utm_medium=cpc&utm_campaign=LS%20Shopping%20MM%20-%20Bing&utm_term=4576648439883566&utm_content=PL%20-Lifesystems%20%3E%20Everything%20Else%20MM) It is only 1/10th the recommended concentration so the liquid does not look yellow green. This should be OK for beginners like me wanting to test reactions. <http://www.hichemicals.com/index.html> supplies sodium chlorite to industry
2. An activator – eg. Hydrochloric acid @ 4% or citric acid @ 50%
3. Preferably distilled water, if not mineral water.

### Method

WARNING: The preparation should be done in a well-ventilated place.  
Avoid breathing the  $\text{ClO}_2$  gas which will be released.

### Day 1

1. Put the small container into the large one.
2. Fill the outer glass with water such that the water level is lower than the top of the smaller container. Use about half a litre of water, but the volume does not really matter.
3. Put 5 ml of the sodium chlorite solution into the inner container and put the cap back on bottle.
4. Put 5 ml of the acid in the inner container and cork the bottle.

5. This activates the production of the gas in the outer jar. It is best to have a jar where the air space is small. The gas is heavier than air and is soluble in water.
6. Leave the jar in a cupboard for 12 - 24 hours. By this time, the water in both containers should have the same colour as sunflower oil.

### Day 2

1. Take the jar outside and open it in a well-ventilated place and avoid inhaling the gas from the container.
2. Take out the inner jar and pour the liquid (the residue) into a capped container for use as a disinfectant.
3. The water in the larger jar will have a concentration of 1500 ppm or 0.15%
4. Add 5 ml of both liquids into the smaller glass as before (steps 3 and 4 in Part 1).
5. Quickly insert the small container into the larger jar as before and close the jar.
6. Leave it aside for 12 - 24 hrs and the water in the jar should have a concentration of the desired 3000 ppm or 0.3%.
7. We need to test the concentration of this master or mother solution with reactive strips. These can only measure up to 500 ppm. So, to test the 3000 ppm, we dilute the solution. We add 9 ml of distilled water to 1 ml of the master solution.
8. Put a few drops of the dilution on the end of the reactive strips. In a few seconds the colour change will indicate that the solution is between 200 and 500 ppm, which is approximately 300 ppm. This multiplied by ten gives our 3000 ppm solution.
9. We can now be sure we have the right concentration.
10. Store the master solution in a dark bottle in the fridge below 11°C

### **SUMMARY** 5 ml of sodium chlorite + 5 ml of activator = chlorine dioxide gas

1. Put the small glass container inside a larger glass jar and add distilled water to a level which does not overflow into the inner container.
2. The ingredients are mixed in a small glass and placed inside the larger jar which is then closed.
3. After 12 hours, the liquid in the inner container is stored in a container for use as a disinfectant. The water in the jar contains 1500 ppm of chlorine dioxide.
4. Repeat step 2.
5. After 12 hours, the liquid in the inner container is stored in a container for use as a disinfectant. The water in the jar contains 3000 ppm of chlorine dioxide in solution.
6. Test the concentration.
7. Store the CDS in a dark bottle in the fridge below 11°C.