



5 LITER BLEACHMAKER

WaterStep's Bleach Maker converts salt water into sodium hypochlorite, commonly called bleach. It is used worldwide as a disinfectant. Bleach can be used as a general-purpose disinfectant for both medical and general sanitation. Likewise, a small quantity of bleach added to a container of water will disinfect it within 30 minutes.

The production of a strong effective disinfectant made on site, easily and at low cost, will promote improved sanitation and hygiene. This will reduce diarrheal diseases, which are a major health problem of the developing parts of the world.

5 LITER BLEACHMAKER with POWER SUPPLY INSTRUCTIONS

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GETTING STARTED - Precautions:



Make the bleach in a well-ventilated area or outdoors.
Do not inhale the fumes from the BleachMaker.



Do not drink the bleach.



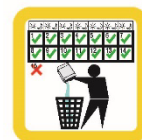
Keep the bleach out of your eyes.



Store the bleach away from children.



Store the bleach in a cool place, out of direct sunlight.



Discard the bleach after 14 days of storage.

Needed:



Electric power outlet, 110 or 220 volts, or a fully charged 12-volt car battery



6 liters of water, at room temperature



A watch or clock



350 milliliters salt (equals 500 grams or 2 cups)

Supplied Parts:



5-liter jerrycan with a cap



Funnel and Safety Glasses



Power Supply Kit -12V power supply converter, cable with battery clamps, power cord, and adapter for the country where the BleachMaker is shipped.



Testing Supplies - 3 Syringes with test kit, which includes a tester and 2 bottles of reagent

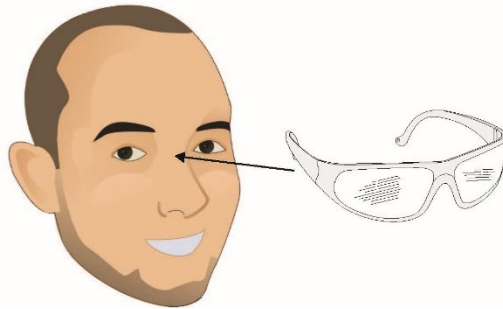


BleachMaker electrode package - "electrodes"

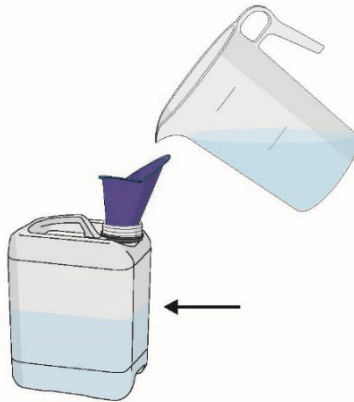


1 Liter measuring cup and set of measuring spoons

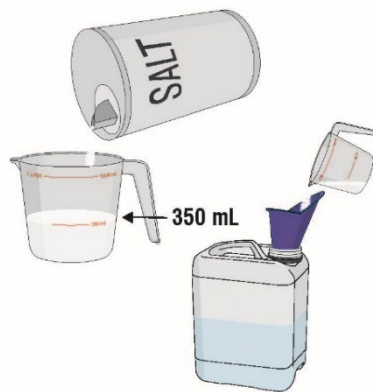
BLEACH PRODUCTION - How to make the bleach:



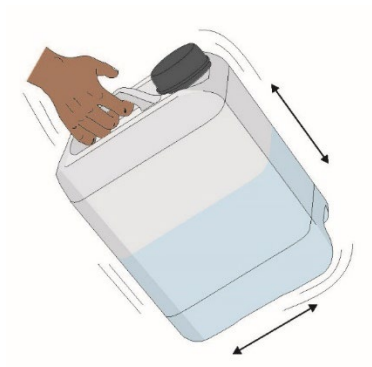
BEFORE YOU START - Put on safety glasses.



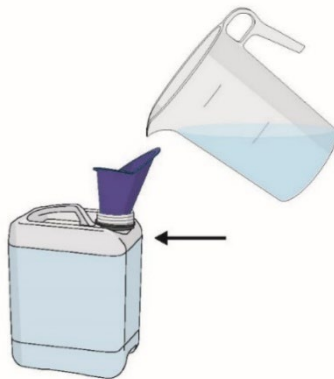
1 - Using the funnel, fill jerrycan approximately $\frac{1}{2}$ full of water.



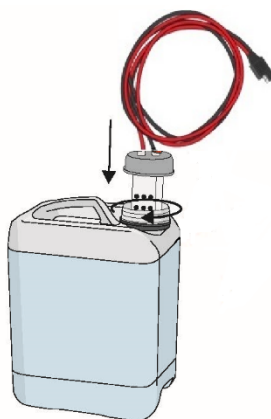
2 - Fill the measuring cup with salt to the 350-milliliter line and pour it into the jerrycan, using the funnel.



3 - Screw on the cap and shake the container hard until the salt is dissolved. Coarse salt will take more time (as much as 5 minutes) to dissolve. Crushing coarse salt into smaller pieces will make it dissolve faster. Check the bottom of the container to make sure all the salt is dissolved after shaking.



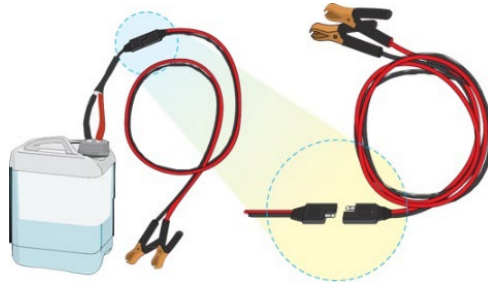
4 - Remove the cap and using the funnel, fill the jerrycan to the “fill line” with water.



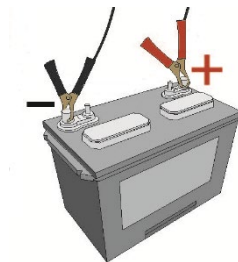
5 - Insert the BleachMaker electrodes into the jerrycan and screw on the ring.

6 - Connect the BleachMaker to a power source.

A. If using a battery:

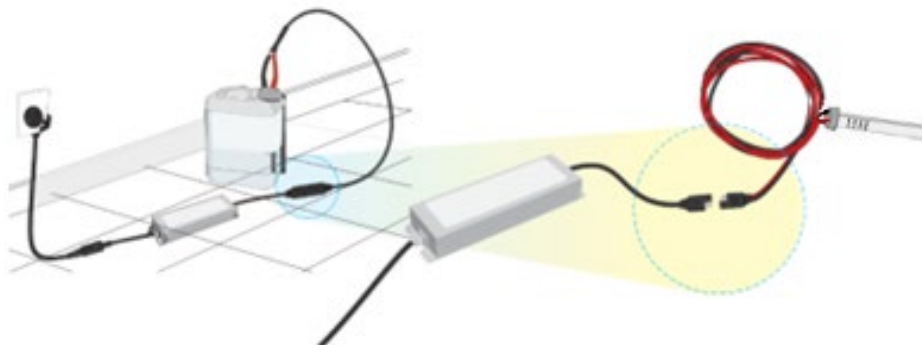


A1 - Connect the cable with the battery clamps to the Bleach Maker cord.

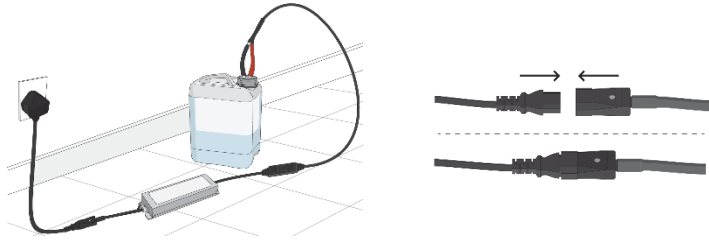


A2 - Connect the red lead to the positive (+) side of the battery and connect black lead to the negative (-) side.

B. If using the provided power supply:



B1 - Connect the BleachMaker to the power supply.



B2 - Connect the power cord plug to the 12V power supply.

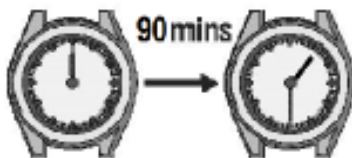


B3 - Plug the power cord into an electrical outlet. If necessary, use a plug adaptor. The unit will automatically adjust to the line voltage.

Safety precautions for the power supply:

- The power supply is ON all the time that it is plugged in.
- When not in use, store the power supply where it will stay dry.
- Do not use the power supply to charge a battery or start a vehicle.
- Do not allow children around the power supply.
- Do not operate the power supply in the rain. If the power supply gets wet immediately unplug it and dry it off.
- The power supply has a self-protecting internal switch. If it doesn't appear to be working, unhook the BleachMaker, check connections, and try again.
- Keep all metal objects (tools, jewelry, etc.) away from the power supply and do not use the power supply on a metal table.

Once the BleachMaker is connected to the power source:



7 - Record the starting time and run the BleachMaker for 1 ½ hour (90 minutes), You should hear a bubbling sound or smell chlorine. If you can't, go to the Troubleshooting Section.

8 - After 1 ½ hour (90 minutes) unplug the power cord from the electrical outlet or disconnect the leads from the battery.

9 - Remove the BleachMaker electrodes from the jerrycan. Tightly screw on the cap and store the bleach in a cool dark place.

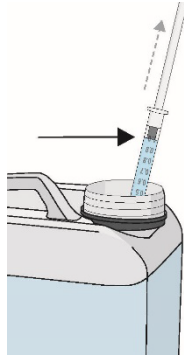
10 - Rinse the electrodes in clean water after making the bleach.

TESTING THE BLEACH

Confirm the bleach is the proper strength:



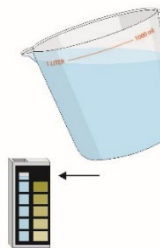
1 - Fill the measuring cup with clean water, to the 1000 milliliter line.



2 - Place the end of the 1 milliliter syringe in the bleach. Fill the syringe with bleach by pulling the plunger back to the 1 milliliter mark.



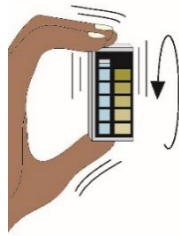
3 - Push the 1 milliliter of bleach from the syringe into the 1000 milliliters of water. Using the syringe, thoroughly stir the mixture.



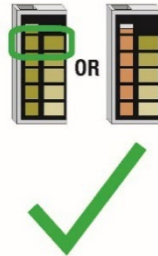
4 - Fill the tester's water column with the mixture from the measuring cup.



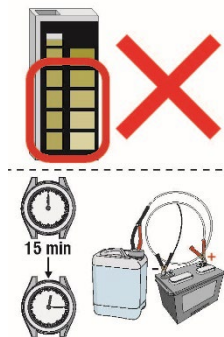
5 - Add 1 drop of reagent, from the test kit bottle to the tester's water column.



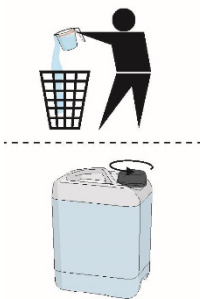
6 - Place your finger over the top of the tester's water column and gently rotate three times.



7 - Compare the color of the water column to the color scale on the tester. If the water column's yellow color matches the yellow on the tester for 5 ppm or if it is orange, then the bleach is the required strength and ready to use.



8 - If the water column color is a lighter yellow and matches 4 ppm or less on the tester, the bleach is too weak. Run the BleachMaker for an additional 15 minutes and retest. If it is still reading less than 5 ppm after the additional 15 minutes, see "Troubleshooting".



9 - After producing bleach of the required strength, dispose of the water in the measuring cup. Close the jerrycan with the cap and store the bleach out of direct sunlight.

USING THE BLEACH FOR SANITATION

Dilution for Cleaning:



For **GENERAL SANITATION** dilute the bleach solution 10 to 1 with clean water. Items to be disinfected should be first scrubbed with soap and water then washed in disinfectant and allowed to air dry before use. Suggested items to be disinfected:



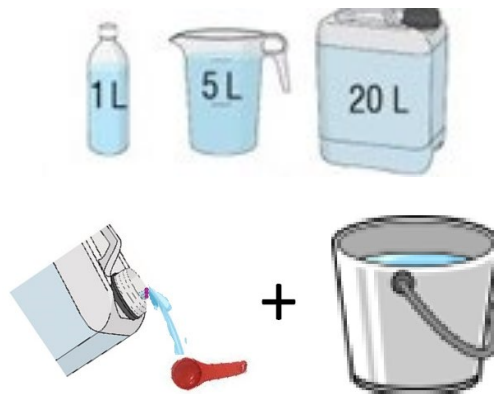
- Drinking water containers.
- Cooking pots, pans, dishes and drinking cups.
- Surfaces used in food preparation.
- Floors and walls of hospital rooms or sickrooms.
- Medical equipment - stethoscopes, thermometers
- Toilet facilities.
- Hands and skin.
- Protective clothing and bedding.

For MEDICAL SANITATION use the bleach solution full strength. Heavily contaminated surfaces or infectious wastes should have full strength disinfectant poured over them and allowed to remain in contact for 30 minutes before cleaning up. Suggested items to be disinfected:



- Medical waste.
- Spills of bodily fluids and feces.
- Parasites, worms

DISINFECTING WATER - How to use the bleach to disinfect water:



1 - Determine the amount of water to be disinfected, then add 1 milliliter of bleach solution for each liter of water to be disinfected.

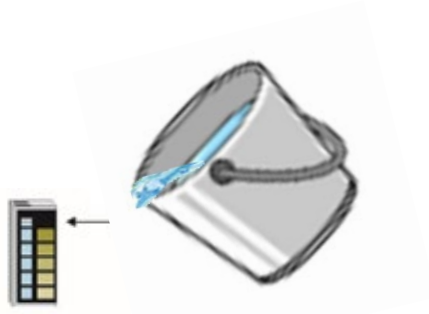
Water	Bleach to Add	
	MEASUREMENTS IN METRIC VOLUME	MEASUREMENTS IN US STANDARD
5 liters	5 ml	1 teaspoon
20 liters	20 ml	1.5 tablespoons
100 liters	100 ml	½ cup
1,000 liters	1 liter	
5,000 liters	5 liters	

If the water is cloudy or colored, filter it through a clean cloth, paper towel or coffee filter. If it cannot be filtered or if the water is very cold, add twice the amount recommended.

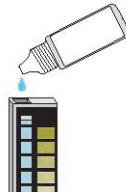


2 - Mix the water and the bleach solution with a clean disinfected stick or if the container has a lid, shake it or stir for 3 minutes. Large tanks will require a long pole or a paddle that will reach the bottom of the tank. If the bleach cannot be stirred, wait 8 hours for the bleach to disinfect the water, not the 30 minutes above.

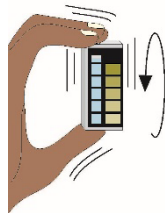
Wait 30 minutes for the bleach to disinfect the water.



3 - Fill the tester's water column from the mixture.



- Add 1 drop of reagent from the test kit bottle.



- Place your finger over the top of the tester's water column and gently rotate three times.

4 - Compare the color of the water column to the color scale on the tester.



If the water column's yellow color matches the 1, 2, 3 or 4 ppm on the tester, the water is ready to drink.



5 - If the water tests 5 ppm or is orange, pour the water from one clean container to another 5 times. Or add additional water that needs to be disinfected. Wait for an additional 30 minutes and retest, step 5.



6 - If the water tests 0.5 ppm or is clear go back to step 2 and add more bleach. Wait an additional 30 minutes and retest. If the water tests .5 ppm or is clear a second time, do not use this water source. Find another water source and start over.

If your first try resulted in too much or not enough bleach, adjust the amount of bleach added the next time you disinfect the same amount of water. After making several successful tests, it will not be necessary to repeat testing, provided the water comes from the same source. It is important to let the mixture sit for 30 minutes and then confirm that the mixture has a faint smell of chlorine.

MAINTENANCE AND TROUBLESHOOTING

Maintenance:

- After every use, rinse the BleachMaker electrodes, jerrycan, measuring cups, funnel, and tester with clean water.
- Keep the battery fully charged.

- After repeated usage, a white lime scale may build up on the electrodes. Soaking the electrodes in vinegar will remove this scale.

Troubleshooting:

No bubbles, bubbling sound, or chlorine smell:

- Make sure salt was added.
- The power supply has a self-protecting internal switch. If it does not appear to be working, unplug it and then plug it in again.
- Check to see if the BleachMaker is connected properly to the battery or power supply.

Low test reading:

- Battery is weak.
- Insufficient time.
- Ensure battery clamps are fastened securely to the battery terminals.
- Insufficient salt or salt not dissolved completely.
- Water is too cold.

References:

EPA - Emergency Disinfection of Drinking Water

CDC - Personal Preparation and Storage of Safe Water

CDC - Make Water Safe

BleachMaker FAQs

20 Liter Plus BM instructions

M-100 instructions

WS website

MSDS Sheets

Manufactured in the United States of America
US Patent 10487409 B1

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