

Biosafety Technical Bulletin

Guidelines for Usage and Hazards of Chlorine Bleach



New information for Bleach Users:

***New Bleach – EPA-Registered, Concentrated Clorox Germicidal Bleach,
is registered to kill more organisms than the current formula!***

This new concentrated germicidal bleach is effective against common germs, viruses and bacteria. Please see the [vendor website](#) for detailed information on each material and the kill time. The CDC's [Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008](#) provides recommendations for use in the medical environment.

Clorox Regular-Bleach maintains its efficacy for 1 year when stored at room temperature. The 'born on' date is marked on the container using the Julian code, which according to Clorox is to be read as follows:

"The letter and first number are producing plant identification; the next 4 digits are a Julian production code and the final 2 digits are a shift identification... Thus, a code A8809507 would be Clorox® Regular-Bleach made in plant A8 on 8095 (8 for 2008 and 095 for the 95th day or April 4th)."

Fresh working solution (~.5% NaClO) should be prepared daily from the concentrated stock solution according to the following chart:

Bleach Dilution Table

% NaClO in Bleach	Dilution	Add about this much bleach to fill up:			
		24-oz spray bottle	Quart	Gallon	5 Gallons
English Units					
5.00%	1:10	2 1/4 oz.	2 1/2 oz.	11 1/2 oz.	59 oz.
6.50%	1:13	1 3/4 oz.	3 oz.	10 oz.	50 oz.
8.25%	1:15	1 1/2 oz.	2 oz. (1/4 cup)	8 oz. (1 cup)	40 oz.
Metric Units					
5.00%	1:10	66 ml	74 ml	340 ml	1745 ml
6.50%	1:13	52 ml	90 ml	296 ml	1480 ml
8.25%	1:15	45 ml	60 ml	235 ml	1180 ml

For Example: if the label on your bleach reads "8.25% sodium hypochlorite", dilute to 1 part bleach and 15 parts water, or 2 oz bleach in a 1 quart container.

Safe Use of Bleach:

Some frequently used workplace and household chemicals are dangerously incompatible with bleach. Toilet bowl cleaners, for example, are typically strong acids and have a pH of around 2. When strong acids are mixed with bleach, a significant volume of highly toxic chlorine gas may be released. Exposure to chlorine gas can cause severe irritation to the skin, eyes, and respiratory tract. Chronic reduced pulmonary function and dental erosion may result from repeated exposure to chlorine.

Ammonia (e.g., glass cleaners or urine) also reacts with bleach to form hazardous products. The result is a class of compounds known as chloramines (NH₂Cl, NHCl₂, NCl₃). Symptoms of exposure to these compounds include irritation of the eyes and respiratory tract and feelings of nausea.

Areas using the Central Glassware Service are reminded that the tanks outside of the laboratories contain dilute bleach solution. Before placing glassware in the tanks, be sure to remove any potentially hazardous chemical, biological, or radioactive residues. Be certain that no traces of acid or ammonia remain on the glassware.

Both at home and at work, you and your family members should always read the label before using a product; many times the label will warn of hazardous mixtures. Never mix hypochlorite solutions with acids or with solutions containing ammonia. There is a potential hazard to become sensitized to bleach or develop a bleach allergy with repeated and frequent long term exposure.

If you have any further questions or would like more information on incompatible mixtures, please contact EHS at 301-846-1451. Chlorine is an element used in industry and found in some household products. Chlorine is sometimes in the form of a poisonous gas. This gas can be recognized by its pungent, irritating odor, which is like the odor of bleach. The strong smell may provide adequate warning to people that they are exposed. Chlorine gas appears to be yellow-green in color. Chlorine itself is not flammable, but it can react explosively or form explosive compounds with other chemicals such as turpentine and ammonia.

How Chlorine Works:

The extent of poisoning caused by chlorine depends on the amount of chlorine a person is exposed to, how the person was exposed, and the length of time of the exposure. When chlorine gas comes into contact with moist tissues such as the eyes, throat, and lungs; an acid is produced that can damage these tissues.

Signs and Symptoms of chlorine exposure:

- Blurred vision
- Burning pain, redness and blisters on the skin if exposed to gas
- Burning sensation in the nose, throat and eyes
- Coughing
- Chest tightness
- Difficulty breathing or shortness of breath
- Fluid in lungs
- Nausea and vomiting
- Watery eyes
- Wheezing

How to protect yourself in the event of a spill or potential exposure:

- Leave the area where the chlorine was released and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure to chlorine.
- If you think you may have been exposed, remove clothing, immediately wash your entire body with soap and water at the nearest safety shower, and get medical care as soon as possible.
- If you have swallowed (ingested) chlorine, do not induce vomiting or drink fluids. Seek medical attention right away.

References:

<http://cloroxprofessional.com/industry/health/knowledge-expertise/facts-about-bleach>

<https://www.osha.gov/publications/OSHA3512.pdf>

<http://www.bt.cdc.gov/agent/chlorine/basics/facts.asp>

http://www.cdc.gov/hicpac/Disinfection_Sterilization/6_0disinfection.html