

## **Sodium Hypochlorite Based Disinfectants Odor versus Respiratory Irritation**

Current uses of bleach (containing Sodium Hypochlorite at the concentration levels in Clorox® products) and bleach based disinfectants in healthcare settings, following the guidelines of use recommended by CDC, have an established history of effectiveness. EPA has registered bleach for use in a variety of healthcare settings, from patient rooms and neonatal nurseries to respiratory therapy rooms when used as directed.

**The real bleach:** Clorox® disinfecting bleach (containing sodium hypochlorite) has been used since 1913 for disinfecting needs everywhere from hospitals and nursing homes to daycares and homes. Most concerns about bleach actually stem from a misperception that bleach contains free standing chlorine. In fact the term “chlorine bleach” is a misnomer because Clorox® Bleach has an entirely different chemistry and is derived from sodium chloride - common table salt. Use of bleach as a disinfectant does not form dioxins...in fact it starts as salt and water and breaks down mainly into salt and water during or quickly after use. As an EPA registered product that kills germs, bleach classification as a ‘pesticide’ and related language can sometimes cause further misperception when bleach is actually one of the world’s most widely available and used disinfectants.

**Bleach and respiratory effects:** The odor of bleach does not equate to significant exposure with potential health consequence. This is because the sensory threshold levels for chlorine species is well below any levels recognized to cause potential respiratory irritation, or overt health effects, and which mirror the current occupational limits. It is unlikely that typical recommended uses of these disinfectants, used in accordance with the label directions, will exceed the occupational exposure limits for chlorine. In fact, the odor threshold for chlorine is 0.002 ppm in air and 0.31 ppm in water (EPA 1994b, 1999). However, perceivable sensory irritation occurs at 1.0 ppm in air (EPA 1999. Cited from “Toxicology Profile for Chlorine”, ASTDR, USDHHS, September 2007).

Odor complaints for bleach are not unlike complaints received for any other chemical with a noticeable smell. Recent investigation by Paustenbauch and Gaffney (Intl. Occup Env. Health., 79: 339-342, 2006) found that for some odorous chemicals, even when one maintains airborne concentrations below a particular OEL (Occupational Exposure Limit), this level of exposure may not be adequate to prevent all persons from reporting an appreciable adverse response. In some cases, workers’ pre-existing belief system about the source of an odor may be sufficient to create anxiety when exposed to any detectable concentration. Dispelling the fear of bleach odor through real facts and information can drastically reduce concerns/complaints.

**Ways to minimize the odor:** It is important to recognize that the distinct chlorine odor is an integral part of the usage of bleach disinfectants. End-users of bleach products should be made aware that the exposure to the smell of bleach should not be a cause for concern. Also, it is important that the areas where these disinfectants are being used are kept well ventilated to ensure that the odors do not build-up.

The smell of bleach in a well ventilated room should not linger after it has been used for cleaning and disinfecting. In fact, bleach breaks down quickly into salt and water. In cases where bleach smell seems to linger or is particularly strong after cleaning has taken place, check to ensure area is well ventilated and product is not being overused. If operating Clorox Commercial Solutions® Clorox® Germicidal Spray, you may want to choose the foam option instead of spray on the trigger nozzle to reduce aerosolization. The foam has a narrower trajectory and is designed to cling onto the surface instead of misting in the air.

Note: As is standard industry practice (and required by OSHA best practices interpretations), always follow the product label instructions and always refer to MSDS and the appropriate instructions.

**Why use bleach for disinfecting:** A combination of education and usage experience over time can help dispel fears about bleach usage. Lets face it, with U.S. Hospital-acquired infections leading to 90,000 deaths and \$4.5 billion in excess health care costs each year\*—and increasing regulations by states to make HAI statistics publicly available—bleach can be an effective tool to improve patient experience. It is an effective disinfectant that is recognized by the CDC and other agencies for killing C. diff spores, MRSA, Mycobacterium bovis (TB) and other hospital acquired pathogens. Its smell of clean can be a powerful, recognizable, and reassuring cue for patients and staff that they are in a clean and disinfected environment.

\* CDC estimates: [http://www.cdc.gov/media/pressrel/r060504.htm?s\\_cid=mediarel\\_r060504\\_x](http://www.cdc.gov/media/pressrel/r060504.htm?s_cid=mediarel_r060504_x)