

## **Guide to Chemical Safety**

Every day potentially harmful chemicals are used around us; in our homes, offices, public restrooms, restaurants, fast food establishments, public and private pools, daycare facilities, health clubs, nursing homes, hospitals, and medical clinics. Many of the people doing cleaning in these facilities have never been properly trained in the use and risks of their chemical arsenal. Despite the current growth of demand for “green” products (many of which are no more or less harmful than traditional cleaners), it is often necessary to use products capable of killing Salmonella, HIV, anthrax, hepatitis, and myriad other life-threatening bacteria and viruses. Such powerful products are potentially harmful to humans by virtue of the valuable functions they fulfill.

If used improperly or without due caution, many common chemicals can harm you. While the majority of us have never suffered from a chemical warfare attack, it is the author’s opinion that you or a loved one WILL suffer injury or illness at least once in your life due to misuse of common chemicals. Chemicals are with us to stay, so what information do you need to avoid injury? This guide hopes to provide that information, beginning with the greatest threats to your health, and culminating with general advice on how to treat someone who has been harmfully exposed.

The forthcoming “Treatment” section will briefly cover what one should do if chemicals are ingested, but it should be self-evident that they are poisonous and professional medical attention should be sought ASAP after consumption.

### **Bleach**

When using chemicals, the most common threat to human health occurs when different cleaning compounds are mixed. Despite universal familiarity with household bleach, few know that mixing bleach with acids (found in toilet bowl cleaners, some disinfectants, and drain openers) produces a substance similar to mustard gas. If inhaled, this gas CAN KILL YOU. Do not mix chemicals without knowing the reactions they will produce.

Bleach is often used in food service and health care facilities. In some states use of chlorine bleach is mandated by state health codes. While I was a student supervisor at a university dining hall, I caught a worker wiping down the serving line with bleach poured straight from the bottle. She didn’t even rinse the surface afterwards (USDA requires all contact or food processing surfaces be rinsed with clean, potable water after using chemical cleaners).

A bleach-water mixture (1 part bleach to 10 parts water) is usually recommended for disinfecting areas. In food service environments, failure to use the appropriate mixture and completely rinse the surface afterward can lead to absorption and ingestion of small amounts of solution with food. Even a small amount of bleach (and many other chemicals) is sufficient to cause the same gastrointestinal symptoms as food poisoning. With around 76 million estimated cases of food poisoning in the U.S. (annually) one wonders how many result from adverse reactions to chemicals instead of from infected food.

### **Acid-Based Products**

Used for a variety of purposes, cleaners employing phosphoric, acetic, sulfuric, or hydrochloric acids, are common. Most school district bids we receive solicit a quote on at least one acid-based toilet bowl cleaner. Corrosive chemicals like acid can cause severe skin burns. If splashed in the eyes, both hydrochloric and phosphoric acids can blind a person in seconds [If a liquid product is described as “corrosive” or “caustic” assume it can destroy the eyes and burn or dissolve skin]. Safety glasses and rubber gloves should always be worn when using acids.

The most startling thing about use of acid cleaners is the lack of safety measures provided by most manufacturers. Go to any retail, grocery, or hardware store with cleaning products, and I'll guarantee you'll find at least one acid-based product with a simple twist-off lid. Any child could open it with ease. These products are in many daycare, kindergarten, and elementary school janitors' closets and carts. Manufacturers should be required to package such products with child-resistant flip-top lids. Centraz Industries, Inc. has packaged our acid-based products with child-resistant, ratcheted lids since 1988, and refuses to provide them without that safety feature.

Finally, as they can react with mild steel and aluminum to produce flammable hydrogen gas, acids should not be used in large quantities (on metals) around open flames.

\*Hydrofluoric acid has had its use greatly restricted in recent years. If used on glass and mirrors, hydrofluoric acid causes a chemical reaction, dissolving the silica and releasing silicon tetra fluoride, another deadly gas. Previously used as a metal cleaner and brightener, hydrofluoric acid can also penetrate through the skin like water, finding it's way into bone marrow. Many deaths have resulted. Burns from hydrofluoric acid take place below the skin, causing intense pain and irreversible damage to muscle and tissue.

If you are asked to use a substance with hydrofluoric acid in it, PLEASE CONTACT ME!! There are unscrupulous individuals in this business who have used restricted chemicals in illegal applications. About a year ago I discovered a company using formalin in hand soap sold to a Missouri school district!! (Formalin is a carcinogenic formaldehyde derivative rated as “extremely hazardous” by the DOT at even 0.1% concentration.)

### **Ammonia**

Ammonia can be purchased in “pure form” or found in many glass cleaners. It has a distinctive odor. Similar to bleach, mixing ammonia with acids or other chemicals can produce noxious, harmful and potentially lethal fumes.

Ammonia and ammonia-based cleaners are harmful for some mirrors (they will react with the mirror's silver, dulling and blurring it).