

# **CHEMICAL SAFETY AWARENESS WHEN CLEANING GLASS COLLECTIBLES: REVISITED**

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Within the past few years, social media has significantly impacted our bottle and insulator collecting hobbies by affording venues to both rapidly disseminate information and dialog with other collectors. This awareness has had the positive result of assimilating many new and younger collectors into our hobbies. As is the “sign of the times”, the desire for “instant information and answers to questions” is often the norm for this younger generation of collectors...especially with respect to item identification, value and tips on cleaning. On a negative note, with respect to safety practices when dialoging about cleaning, responses are typically subjective, superficial and often inaccurate.

Most collectors want to preserve and display their collectibles in as clean and pristine condition as possible. By the nature of their use and disposal, glass bottles and insulators present more challenges to the cleaning and restoration processes than many other collectibles do, and most collectors have experimented with different cleaning agents and methods to effectively accomplish these processes. Typically, the practice of “presoaking” the item in either an acidic or a basic solution prior to “mechanical” cleaning is used to loosen or remove unwanted surface films. However, many of the chemicals and substances that are routinely suggested for this step can be hazardous, or even fatal, if proper safety precautions are not adhered to! Thus, the focus of this document is to address hazards, which may not be immediately obvious, and precautions that should be taken when using some of the chemicals that are often employed in the cleaning process.

There are many hazardous chemicals, particularly acids, bases and solvents, that are routinely utilized by collectors to clean their antique glass, and you don't have to be a "chemist" to be able to procure them. Many can be purchased at your local drugstore, hardware store or builder's supply center, as they are sold for other uses, such as stone & concrete cleaning, pool cleaning, wood bleaching, metal cleaning, paint & tar removal, etc. Some have even been marketed specifically for cleaning and removing stains from antique bottles and glass. It is of the utmost importance that you understand the chemicals that you choose to work with, that you are aware of their hazards and that you follow proper safety precautions and practices when using them!

There are two important sources of information about chemical hazards that are available to a user - product labels and the Material Safety Data Sheets (MSDS) associated with the product. Knowing how to properly read labels is important, and it is the legal right of every user to know the contents of a product, or at least the hazards associated with such, if the ingredients are proprietary. The MSDS document, which serve as a standard for hazard communication in laboratories, schools and industry, contains in-depth information about a chemical's properties, hazards, precautions and control measures. If a supplier cannot provide you with a MSDS at the time of purchase

of a specific chemical, contact the manufacturer or distributor for a copy...or search online for a copy to download.

When using a specific chemical, there are three main areas dealing with personal safety that you should be aware of: the chemical's corrosiveness, toxicity and its reactivity/incompatibility with other substances. As a minimum, use the following safety practices when using other than common, safe household cleaning agents: know the chemicals, wear proper chemical-resistant gloves and clothing for skin protection, wear goggles or proper eye protection and/or use a Plexiglas "splash shield", work in an area with adequate ventilation and use good housekeeping practices! Always store chemicals safely, and keep any long-term soaking-baths covered and located where curious children or pets cannot get into them. In case of skin or eye contact with most of the chemicals of concern here, immediate first aid would be to flush the exposed area with plenty of water and seek medical attention, as necessary. Follow local laws and safe practices for the proper disposal of spent chemicals and cleaning solutions. Corrosive and/or toxic materials cannot be simply washed down a sewer, dumped in a stream or landfill or allowed to get into your home septic system!

Never mix chemicals or cleaning agents with the anticipation that they will do a better cleaning job, unless you are sure that they will interact safely. Mixing incompatible substances could result in a release of heat accompanied by violent boiling and splattering (e.g., via the addition of water to concentrated mineral acids), the release of toxic or deadly gases (e.g., mixing acids with bleaches or cleansers) or combustion (e.g., mixing acids with organic solvents).

Using strong mineral acids, such as hydrochloric acid (i.e., muriatic acid) or sulfuric acid (i.e., oil of vitriol), to clean antique glass is not worth the risks to your personal safety unless you are trained in their safe use and handling. The liquids and vapors are extremely corrosive and cause severe burns to all body tissue, they can react violently with many incompatible substances (e.g., strong bases, metals, metal salts, organics, other acids, water, combustible materials) and they are harmful to the environment. Adding water to concentrated mineral acids is very dangerous, and the heat generated could easily crack the fragile glass object containing the mixture. Strong bases such as sodium hydroxide (i.e., caustic soda or lye) are also very corrosive and can cause severe burns to the skin...and they will also attack and dull "soft" glass upon prolonged exposure. Some commercial hydrochloric acid-based cleaning agents (e.g., "Acid Magic") are marketed as being "safer" to use because they are "buffered"...but they are still concentrated and require proper handling and safety precautions!

Oxalic acid, which is marketed as a wood bleach, is routinely used as a presoaking agent...especially among insulator collectors. Dissolving the white crystals in water results in a moderately-strong acidic cleaning solution, coupled with the ability of the resulting oxalate ion to bind some metallic contaminants that may be present. As it will not immediately burn the skin as a mineral acid or caustic solution will do, a user may think that the use of chemical-resistant gloves is an unnecessary precaution. Besides being corrosive, oxalic acid is extremely toxic and can be absorbed directly through the

skin, possibly resulting in symptoms similar to those seen from acute ingestion of the compound. Local and/or systemic effects of this toxin can be extremely severe. The compound complexes with calcium in the body, and kidney or brain damage could result from the formation of calcium oxalate deposits if sufficient amounts are absorbed or ingested. Oxalic acid is also found as an ingredient in the commercial powdered cleanser Bar Keepers Friend (BKF).

Although Bar Keepers Friend is intended to be used as a cleanser, collectors, especially in the insulator hobby, have increasingly been using it as a source of oxalic acid for presoaking. The commercial powder, which contains feldspar as an insoluble abrasive, contains 7-10% oxalic acid by weight, which will dissolve when a solution of the cleanser is made. The acid strength of the solution will depend upon the BKF-to-water ratio, thus, it could become relatively strong. The MSDS for BKF does include hazard warnings and precautions associated with skin and eye exposure, as well as warnings of incompatibility with other cleaning products. Thus, prolonged exposure to unprotected skin of a solution prepared from BKF is not recommended, due to hazards identified in the preceding paragraph.

Ammonium bifluoride is another extremely hazardous crystalline compound that is sometimes used in cleaning and removing stains from bottles and insulators. A solution of extremely dangerous and highly corrosive hydrofluoric acid is formed when this compound, and similar salts, are dissolved in water. This acid readily attacks, etches and dissolves glass...and it could easily do more harm than good to your antique glass object. Early "soft" glass and some cobalt glass formulations are especially susceptible to attack. If allowed to come in contact with your skin, hydrofluoric acid is readily absorbed...resulting in bone decalcification, slow-healing tissue damage, burning and blistering underneath the skin, which is accompanied by excruciating pain! Using concentrated hydrofluoric acid (HF), whose vapors are also corrosive, should never be contemplated by a novice; without access to a professional laboratory environment and proper personal protective equipment, the use of such is not worth the risk to personal health and safety!

Use proper personal protection when cleaning with organic solvents, paint thinners, kerosene, etc., also. Prolonged skin exposure can result in dermatitis, vapors are harmful, these substances are highly flammable and some are even carcinogenic (cancer-causing).

Armed with a non-scratching powdered cleanser and nylon pad, detergent, bottle brushes, a toothbrush and elbow grease, most glass collectibles can be satisfactorily cleaned and restored without resorting to the use of hazardous chemicals. Presoaking in common and safe cleaning agents can often be very effective in loosening years of accumulated soot and grime. However you choose to clean your bottles and insulators, be informed, be cautious, act responsibly and use common sense!