

Safe Storage and Use of Perchloric Acid

Introduction

Perchloric acid is a strong mineral acid. Under some circumstances it may act as an oxidizer and/or present explosion hazards. This safety bulletin presents information to allow you to handle and store perchloric acid safely.

Hazards common to all mineral acids

Perchloric acid in concentrations up to 72.5% and used at room temperature acts similarly to other strong acids. Precautions for using perchloric acid under these conditions are similar to those for other mineral acids:

- Wear suitable gloves, eye protection, and other protective clothing to protect in the event of splashes and spills.
- Dilutions should be performed by adding perchloric acid to water, not the other way around.
- Limit quantities in storage to what is needed for the next 6-12 months.

Hazards specific to perchloric acid

Anhydrous perchloric acid is unstable and should not be used. Fortunately, perchloric acid does not become anhydrous in storage because of the zoetrope formed with water at a concentration of 72.5%.

Concentrated perchloric acid (70%) is an oxidizer only at temperatures above 150° C. Perchloric acid should not be mixed or used with organic materials if there is a possibility that temperatures will become elevated beyond ambient levels.

Perchloric acid digestions and other uses at elevated temperatures require that the procedures be conducted in a specially designed fume hood with a water wash down system. This system is required to prevent the buildup of explosive perchlorates in the duct work. If you have been performing perchloric acid digestions in a fume hood not specifically designed for perchloric acid, contact ORS 2-4996 immediately for an evaluation of the hood for perchlorate contamination.

Spills and other emergencies

In the event of spills, neutralize with soda ash or other appropriate neutralizing agent. Soak up the spill with an inorganic based absorbent. Do NOT use rags, paper towels, or sawdust and then put them aside to dry out, as such materials may spontaneously ignite. Likewise, spills on wood may present a fire hazard after the liquid dries.

In the event of a fire, the best extinguishing agent is water.

Storage of perchloric acid

Perchloric acid should be stored with other inorganic acids and away from organic chemicals and materials. The containers should have secondary containment, such as a poly tray, in the event of spills. Refrigeration provides no additional safety benefits.

Discoloration: if a bottle containing perchloric acid has turned dark and has crystals forming around the bottom of the bottle, there is a potential explosion hazard. Do NOT move the bottle, but contact ORS at 2-4996 for immediate assistance.

White crystals forming around the neck and cap of a bottle of perchloric acid in storage are almost always an ammonium salt. This may be washed off the bottle with water and the rinsate disposed down the drain.

Source

The primary source of information for this safety bulletin is GFS Chemicals, Columbus, Ohio.