

# Perchloric Acid

Perchloric acid is a super acid with a pKa of -7 that can easily form explosive peroxides. In some circumstances, the use of a stainless steel fume hood, complete with a wash down system may be necessary.

## HEALTH HAZARDS / TOXICITY

Perchloric acid is a corrosive liquid. It is not combustible itself but, as an oxidizer, it can increase the potential for ignition or explosion of other compounds.

- **Acute effects:** Corrosive to skin and mucous membranes. Inhalation may produce dyspnea, pleuritic chest pain, upper airway edema, pulmonary edema, hypoxemia, bronchospasm, pneumonitis, and persistent pulmonary function abnormalities. Airway hyperreactivity has also been reported. The onset of respiratory symptoms may be delayed for several hours.
- **Chronic effects:** Repeated exposure to dilute solutions may cause skin rash and possible sensitization.
- **Local effects:** Corrosive to skin and mucous membranes. Skin exposure can cause burns and irritation, and the compound can be extremely harmful to the digestive tract, if swallowed.
- **Systemic effects:** Perchloric acid, given orally or subcutaneously to rats and mice, showed a specific antithyroid action, and also induced abnormalities in hepatic, renal, cardiovascular and hemopoietic functions.

## EXPOSURE LIMITS

Not applicable.

## SAFE HANDLING AND STORAGE

### Incompatibilities

Perchloric acid is a strong inorganic mineral acid which is not compatible with organic acids or materials and must be stored separately. If a separate storage cabinet is not available, segregation can be accomplished using secondary containment bins. Perchloric acid is also incompatible with rubber stoppers and some types of grease, so plan accordingly when setting up reactions.

### General Storage information

Always store at room temperature and away from heat sources and open flames. Perchloric acid becomes an oxidizer at temperatures of 150°C and can explode.

### Safe Use of Perchloric Acid

Digestion of organic samples or heating of perchloric acid **requires** that the work is performed in a stainless steel fume hood that is equipped with a wash down system. Contact HSRM or see the Perchloric Acid Guidance Document for more information about designated perchloric acid fume hoods.

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- Prior to working with perchloric acid, make sure any organic material (i.e. paper) and extra chemicals are removed from the fume hood.
- To follow best practices, perform your work with perchloric acid inside of a non-reactive secondary containment tray (i.e. glass) that is large enough to contain your entire bottle if it were to spill.
- When preparing a dilution of perchloric acid, always add concentrated perchloric acid to water.

## EMERGENCY AND SPILL INFORMATION

**Inhalation:** Remove the victim from the exposure area to fresh air immediately. Keep the affected person warm and at rest. Seek medical attention immediately.

**Skin Contact:** Symptoms of skin exposure are burning and irritation. Remove contaminated clothing, and wash the exposed area for 15 minutes. For splashes on the trunk of the body, you should remove clothing and rinse thoroughly under the emergency shower. Dispose of any contaminated clothing as hazardous waste.

**Ingestion:** If perchloric acid is ingested, drink approximately 8 oz. of water and seek medical attention. Do not induce vomiting.

**Eye Contact:** Remove contact lenses. Flush eyes at the emergency eyewash station for 15 minutes. Make sure to lift the eyelids several times to ensure that all areas of the eye get flushed. Seek medical attention immediately.

### Spill Information:

- Perchloric acid is extremely hazardous once it has dried. Do not allow a perchloric acid spill to dry.
- Neutralize a *small* spill by completely covering it with soda ash. Cover the area liberally with water and sop up with wet rags. Keep the rags wet with water and place in a sealed plastic bag. Never use paper towels or combustibles to clean up a perchloric acid spill.
- Mop water and rags from the spill clean-up should be disposed as hazardous waste. Contact the [Regulated Waste Program](#) (612) 624-1604 as soon as possible to pick up the spill materials.
- In the event of a *large* perchloric acid spill, call 911 and request HSRM spill assistance. Do not attempt to clean up the spill yourself.

## CHEMICAL WASTE AND CLEAN-UP PROCEDURES

- Dispose of perchloric acid containing solutions as hazardous waste. For guidance, visit the [Regulated Waste website](#).
- Do not mix perchloric acid containing waste solutions with other liquid waste.
- If you suspect perchloric acid was used in an unapproved fume hood, contact HSRM at (612) 626-6002 for perchloric residue testing. Do not attempt to clean a contaminated hood yourself.