



Laboratory Safety Fact Sheet: Organic Peroxides & Peroxide-Forming Chemicals

The fact sheet provides information on safe handling organic peroxides & peroxide forming chemicals.

What are Organic Peroxides and Peroxide-Forming Chemicals?

An organic peroxide is an organic (carbon-containing) compound containing two oxygen atoms joined together (–O–O–). This chemical group is called a peroxy group.

The primary hazards associated with organic peroxides are fire and explosion. Most undiluted organic peroxides can ignite easily and burn rapidly and intensely because they contain both fuel (carbon) and oxygen within the same compound.

Some organic peroxides are dangerously reactive and may decompose rapidly or explosively when exposed to relatively small amounts of heat, friction, mechanical shock, or incompatible materials.

Certain solvents and other chemicals can also form peroxides during storage, creating a hazard over time.

Common Peroxide-Forming Chemicals

- Diethyl ether
- Tetrahydrofuran (THF)
- 1,4-Dioxane
- Diisopropyl ether
- Vinyl ethers
- Isopropyl Alcohol

Hazards

Fire & Explosion

- Most undiluted organic peroxides can ignite easily and burn rapidly.
- Organic peroxides contain both fuel and oxygen, allowing them to burn intensely.
- Some may decompose rapidly or explosively when exposed to:
 - Heat
 - Friction
 - Mechanical shock
 - Incompatible materials

Peroxide Formation

- Peroxides-forming solvents can develop potentially hazardous peroxide during storage.
- Peroxides may become increasingly hazardous as chemicals age.
- **Never allow peroxide-forming materials to become concentrated or dry.**

Freezing Hazard

- Liquid organic peroxides must never be allowed to freeze. Phase changes can increase the sensitivity of these compounds to shock and heat.
- Peroxide-forming materials should be kept cool but should not be refrigerated, as refrigeration may freeze out or precipitate the peroxide.

Safe Handling & Storage

Storage

- Store organic peroxides and peroxide-forming materials protected from heat and light.
- Keep materials cool, but do not refrigerate.
- Where required, store under an inert gas blanket, such as nitrogen or argon.
- Purchase only immediate-use quantities whenever possible.

Handling

- Use ceramic or plastic spatulas when handling organic peroxides. Never use metal spatulas.
- Do not subject organic peroxides to:
 - o Friction
 - o Grinding
 - o Impact
 - o Mechanical shock
- Never repackage organic peroxide in glass containers with screw caps or glass stoppers.

Dilution

- Organic peroxides should be diluted with an inert solvent, such as mineral oil, to reduce sensitivity to heat and shock, where appropriate.

Peroxide Testing: Peroxide-Forming Solvents

Peroxide-forming solvents should be:

- ✓ Tested upon receipt from the manufacturer
- ✓ Tested after every 3 months of storage
- ✓ Tested before heating

Instantaneous peroxide indicator strips may be used for testing.

After testing:

- Record the date tested and test status on the container.
- If peroxide is detected, contact Environmental Health and Safety (EHS).

Do not heat a peroxide-forming solvent until it has been checked for peroxides.

Distillation

- Never distill a peroxide former to dryness.
- Before distilling a known or suspected peroxide former, check it carefully for the presence of peroxides.

Disposal

- Peroxide-forming materials for which there is no planned use should be disposed of through EHS.
- Do not attempt to dispose of or treat a potentially dangerous peroxide-containing material unless you are trained and authorized to do so.

STOP & CONTACT EHS

Do not handle, move, open, heat, or distill a container if you suspect dangerous peroxide formation.

STOP WORK → DO NOT DISTURB THE CONTAINER → ISOLATE THE AREA → CONTACT EHS

For immediate danger, fire, explosion, or other emergencies, **call GTPD** (404-894-2500) and follow your laboratory's emergency procedures.

Contact EHS:

For questions, suspected peroxide formation, testing or disposal:

EHS Emergency Number: 404-216-5237

Email: lab-chemsafety@gatech.edu