

Safety Module

Safety Topic: Peroxide Forming Chemicals (PFCs)

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- **Purpose** – Certain types of chemicals react with atmospheric oxygen over time to form peroxides and may explode upon impact, heat, or friction.



Classification of PFCs

<u>Class A</u> <i>Severe Peroxide Hazard</i>	can form peroxides and decompose without concentration (e.g. isopropyl ether, sodium amide)
<u>Class B</u> <i>Concentration Hazard</i>	can form explosive peroxides when concentrated (e.g. diethyl ether, dioxane)
<u>Class C</u> <i>Shock and Heat Sensitive</i>	can violently auto-polymerize after internal peroxide accumulation (e.g. acrylonitrile, styrene)
<u>Class D</u> <i>Potential Peroxide Forming Chemicals</i>	normally stable compounds - may form peroxides under the right conditions (e.g. furan, benzyl ether)

- **Equipment** – Lab glasses, lab coat, nitrile gloves, peroxide test strips
- **Safety Practices for PFCs-**
 - Purchase PFCs which contain a peroxide formation inhibitor or stabilizer like butylated hydroxytoluene (BHT) if possible
 - Date containers of PFCs upon arrival & opening
 - Store in cool dark place, in the original container and inspect frequently
 - Test with peroxide test strips periodically (every 6 months for classes B, C and once a year for class D)
- **Specific considerations** –
 - Signs of crystallization, discoloration, and stratification may indicate that the compound has become shock sensitive– do not move or open the container; contact EHS for disposal
 - Confirm that PFCs have been tested for peroxide formation before distillation or evaporation, do not distill to dryness
- **Disposal:**
 - Class A PFCs after 3 months (after opening) or 12 months (unopened)
 - Containers of PFCs as hazardous waste if suspected (e.g., from visual evidence) or known to contain peroxides and alert EHS
 - Containers of unknown age especially of Class A and B peroxides.
- **For more information see** –
 - <http://ccc.chem.pitt.edu/wipf/SOPs/Peroxide%20Forming%20Chemicals.pdf>
 - <https://www.vumc.org/safety/chem/peroxide-forming-chemicals> (Full List of PFCs)
 - <https://ehs.yale.edu/sites/default/files/files/organic-peroxides-sop.pdf> (SOPs)