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Decided by: Mikael Corell	Type of document: Routine	
Responsible officer: Hanna Gustavsson	Responsible administrative department: Property Management Office	

Routine for peroxide forming chemicals

A variety of organic compounds spontaneously forms peroxides by a free radical reaction of the hydrocarbon with molecular oxygen in a process of autoxidation. The reaction can be initiated by light, heat or by contamination. The reaction is self-propagating and one initiating event may form many peroxide molecules. To bring attention to these chemicals a label must be attached to their containers and a note, together with the instruction, put on the cabinet where it is stored. See appendix 3 and 4.

As a class peroxides are exceptionally prone to violent decomposition that can be initiated by heat, friction or mechanical shock as from opening the container. Dry crystals are much more likely to ignite than liquid but once ignited the burn rate increases as the fire progress.

The peroxideizable chemicals are divided into four different categories (Jackson et al. 1970 and Kelly 1996). Category A-C contains a limited number of chemicals and each category is well described. Category D chemicals are those that do not fit in to any of the first categories, often due to lack of known data. In some cases, they are less likely to produce peroxides under normal handling but others have been involved in violent explosions also under “normal” handling. Read safety data sheet and/or Bretherick’s Handbook of Reactive Chemical Hazards to find out more. Share important information on the label.

Some frequently used classes of chemicals that could be peroxide forming are: ethers, acetals and ketals, aldehydes, secondary alcohols and compounds containing benzylic or allylic hydrogens. In this document you will find chemicals listed in alphabetical order separated by class and also by CAS no.

Many peroxide forming solvents are distributed with an inhibitor. The inhibitor will be consumed over time. It will also be removed in distillation processes. Category C chemicals usually contain an inhibitor. Category C chemicals without inhibitor must be taken care of within 24h after opening. Especially important is to store diethyl ether in its original container as the iron acts as an inhibitor.

Paper towels, napkins or other organic material in contact with the peroxide forming chemicals must be avoided. And when needed, be taken care of with the greatest care and precautions.

There are no known safe dilution concentrations for peroxides or peroxide forming chemicals.

Read more, see references: Clark and Bretherick's.

If any error, new CAS no. or new information is discovered inform the Chemical Compliance Officer, labsafety@su.se.

Plan purchases

- Buy as much as you plan to use, not more.
- Buy as much as you will use within a 3-month period.
- Select smaller containers (1L or smaller).

Receiving routine

- Must always be taken care of directly on arrival.
- Before handling the containers, a visual check must be made.
- Always label the containers with a properly marked warning label with arrival date, opening dates, testing frequencies and other important information. (Other information is especially important for the cat D chemicals).
  Think about not to cover any important information on the original container. Labels can be put directly on the container, if possible, or attached by a string. (The string should not be attached too close to the cap or opening as there will be an increased risk with crystal formation on the string as well as this might prevent seeing any crystals formed under the cap.)

Storage and handling

- Store in darkness at cool temperatures, follow the storage recommendations in the SDS.
- Should be stored in original containers whenever possible.
- When working in the lab take only out the daily volume and protect it from light.
- Avoid using containers with loose fitting lids and ground glass stoppers.
- Before handling the containers, a visual check must be made.
- Never lift the container by the cap.
- When handling protect from light and heat.
- Testing for peroxides should be performed as often as required and always before distillation or evaporation of peroxidizable chemicals.
- Solid peroxidizable chemicals are generally not tested and must be sent for destruction before expiration date.
- Diluted peroxidizable chemicals should also be tested. (Essential to use clean glass.)
- Never use force to open a cap that “is stuck” or rusty. There might be invisible crystal formation.
- Especially important is to store diethyl ether in its original container as the iron acts as an inhibitor.
- When transferring solvents with iron, BHT or other particles added as inhibitor make sure you get some into the new flask.

- It is not allowed to keep transferred category C chemicals without inhibitor for more than 24h.

Visual inspection

This is done in two steps first on the shelf and then after carefully lifting it out.

- Is the container in good condition? (No deformation cracks etc.)
- Is the container and cap free of crystals (DO NOT OPEN TO DETERMINE THIS)?
- Is the container free of stratification, cloudiness & wisp-like structures?

If any of the answers is 'No' do not touch/ move the container. It is safe as long as it is not disturbed. Inform local laboratory safety coordinator or head of department. Contact the University's hazardous waste contractor.

Concentration control of organic solvents

Should only be done by an experienced chemist.

- If there is any indication that you have crystals under the cap or if you see any stratification, cloudiness or wisp-like structures, **do not touch**! Inform your local laboratory safety coordinator and contact the University's hazardous waste contractor.
- If pH is out of the range 1-9 buffering might be needed, see test kit instructions.
- Easiest done by using test strips like Quantofix Peroxide 1-100 mg/L (semi quantitative test). Test strips need to be fresh. Read the instruction carefully. **Addition of a drop of water might be needed for correct measurements.** Contact your local laboratory safety coordinator of how to get these.
- If test result is
    - <3 mg/L safe to use.
    - 3<x<30 mg/L handle as hazardous waste
    - >30 mg/L Cautiously close lid and contact the University's hazardous waste contractor and inform your local laboratory safety coordinator.

Waste management

- Peroxidizable chemicals waste should be taken care of separately, if possible, in smaller containers that is never stored for more than a week at the time. Handle as hazardous waste.
- Always check the waste container for accurate concentrations of peroxides before leaving it for destruction. Confirm the testing on the waste label. Note any detectable concentration. Residues of additional chemicals can initiate peroxide formation.

- Old containers of peroxidizable chemicals, or containers of unknown age or history, or containers where it is not possible to see its content, must be handled very carefully. Handle as if the concentration is >30mg/L.
- If a container has been mistreated for example exposed to light, higher temperatures or stored for too long, handle as if the concentration is >30 mg/L.
- Any spill should be taken care of by Vermiculite or similar adsorbent. Slurry with suitable solvent and handled as hazardous waste.
- Paper towels used to wipe up peroxide forming chemicals must be taken care of with great care and precautions. Peroxide formation on organic material is a well-documented risk. Slurry with suitable solvent and handled as hazardous waste.
- The waste slurry can be treated with acidic ferrous solution (Clark *2001*).

References

Jackson H.L et al., Control of Peroxidizable Compounds*, J.Chem. Educ.* 1970, 47, A175

Kelly, R.J., Review of Safety Guidelines for Peroxidizable Organic Compounds, *Chemical Health & Safety*, 1996, 3(5), 28

Clark D.E., Peroxides and Peroxide-forming Compounds, *Chemical Health & Safety*, 2001, 8(5), 12-21

Breatherick's Handbook of Reactive Chemical Hazards (7th ed) 2015, Vol 2 - *Peroxidisable Compounds*, 317-321

Appendix

Appendix 1 Peroxidizable chemicals sorted by group

Appendix 2 Peroxidizable compounds sorted by CAS number

Appendix 3 Sign to be posted on cabinets containing peroxidizable compounds

Appendix 4 Label for containers with peroxidizable compounds.

Known peroxidizable chemicals

Should be labelled with EUH019 - Chemicals that may form peroxides.

There might be other peroxidizable compounds that is not included in this list. Always read SDS carefully.

Appendix 1 Peroxidizable chemicals sorted by group

Class A: Peroxide Hazard on Storage – Without Concentration

Chemicals that form explosive peroxides without concentration. Severe hazard after prolonged storage, especially after exposure to air. Should be stored under N2 if possible. Regularly test these items no less than every 3 months or discard.

Chemical name	CAS
Butadiene	106-99-0
Butyl methyl ether	628-28-4
Chloroprene	126-99-8
Diisopropyl ether	108-20-3
Divinyl acetylene	821-08-9
2-Methoxypropene	116-11-0
Potassium amide	17242-52-3
Potassium metal	7440-09-7
Sodium amide	7782-92-5
Tetrafluoroethylene	116-14-3
Triethylene glycol dimethyl ether	112-49-2
Vinylidene chloride	75-35-4

Class B: Hazard Due to Peroxide Concentration

Peroxide hazards on concentration. Regularly test these items no less than every 12 months or discard. Test before peroxide formation before distillation or evaporation. And if so always leave more than 10% at bottom.

Chemical name	CAS
Acetaldehyde	75-07-0
Benzyl alcohol	100-51-6
1,4-Butanediol divinyl ether	3891-33-6
2-Butanol	78-92-2
Butyl methyl ether	628-28-4
Butyl vinyl ether	111-34-2
1,2-Chloro-1-butanol	928-51-8
2-Chloroethyl vinyl ether	110-75-8
Cyclohexanol	108-93-0
Cyclohexene	110-83-8
2- Cyclohexene-1-ol	822-67-3
Cyklohexyl vinyleter	2182-55-0

Cyclopentene	142-29-0
Cumene	98-82-8
Decahydronaphthalene (‘decalin’)	91-17-8
Diacetylene (Butadiyne)	460-12-8
Dicyclopentadiene	77-73-6
1,1-Diethoxyethane	105-57-7
Diethyl ether	60-29-7
Diethylether-d10, Ether-d10	2679-89-2
Diethylene glycol dimethyl ether, (‘diethylene glycol’, ‘diglyme’)	111-96-6
3,4-Dihydro-2H-pyran	110-87-2
Dioxanes part 1,4-Dioxane	123-91-1
1,4-Dioxan-d8	17647-74-4
Ethyl vinyl ether	109-92-2
Etylene glycol dimethyl ether, ('glyme')	110-71-4
2-Ethoxyethenol, (Ethylene glycol dimethyl ether ‘cellosolves’)	110-80-5
Furan	110-00-9
4-heptanol	589-55-9
2-hexanol	626-93-7
3-Hydroxytetrahydrofuran	453-20-3
2-Methoxyethyl vinyl ether	1663-35-0
2-Methoxypropene	116-11-0
Methyl acetylene	74-99-7
3-methyl-1 butanol	123-51-3
Methyl cyclopentane	96-37-7
Methyl isobutyl ketone	108-10-1
4-methyl-2-pentanol	108-11-2
Methyl propargyl ether	627-41-8
2-pentanol	6032-29-7
4-penten-1-ol	821-09-0
1-phenylethanol	98-85-1
2-phenylethanol	60-12-8
2-propanol (isoproranol, “IPA”)	67-63-0
Propyne	74-99-7
Tetrahydrofuran	109-99-9
Tetrahydrofuran-d8	1693-74-9
Tetrahydronaphthalene	119-64-2
Triethylene glycol dimethyl ether	112-49-2
Vinyl ethers	
Other secondary alcohols	

Class C: Auto Polymerize as a Result of Peroxide Accumulation

Chemicals, which are hazardous due to, peroxide initiation of autopolymerization. The peroxide formation increases for liquids in this group, especially for butadiene, chloroprene and tetrafluoroethylene. Regularly test these items no less than every 6 months or discard. Discard gases after maximum 1 year. These items are often sold with an inhibitor added to the substance, they still need to be checked, as the inhibitor is consumed if peroxides do form. After opening, materials without inhibitors should not be stored for more than 24h.

Chemical name	**CAS**
Acrylic acid	79-10-7
Acrylonitrile	107-13-1
Butadiene (*gas*)	106-99-0
2-chlorobutadiene	126-99-8
Chlorotrifluoroethylene (*gas*)	79-38-9
1,1-Dichloroethylene	75-35-4
Methyl methacrylate	80-62-6
2-pentanol	6032-29-7
Styrene	100-42-5
Tetrafluoroethylene (*gas*)	116-14-3
Vinyl acetate	108-05-4
Vinyl acetylene, (Buten-3-yne) (*gas*)	689-97-4
Vinyl chloride	75-01-4
2-Vinyl pyridine	100-69-6
4-Vinyl pyridine	100-43-6

Class D: May Form Peroxides

Materials that do not fit within Group A or B or C but require special handling. These chemicals have the potential to form peroxides with varying conditions of use. Consult the manufacturer’s SDS to determine when peroxide formation is expected and label accordingly.

Chemical name	**CAS**
Acrolein	107-02-8
Allyl ethyl ether	557-31-3
Allyl phenyl ether	1746-13-0
1-Allyloxy-2,3-epoxypropane	106-92-3
p-(n-Amyloxy)benzoyl chloride	36823-84-4
n-Amyl ether	693-65-2
Arachidonic-5,6,8,9,11,12,14,15-d8 acid	69254-37-1
Benzyl n-butyl ether	588-67-0

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Benzyl ether (dibenzyl ether)	103-50-4
Benzyl ethyl ether	539-30-0
Benzyl methyl ether	538-86-3
Benzyl-1-napthyl ether	607-58-9
1,2-Bis(2-chloroethoxyl)ethane	112-26-5
Bis(2-ethoxyethyl)ether	112-36-7
Bis(2-(methoxyethoxy)ethyl) ether	143-24-8
Bis(2-chloroethyl) ether	111-44-4
Bis(2-ethoxyethyl) adipate	109-44-4
Bis(2-methoxyethyl) carbonate	626-84-6
Bis(2-methoxyethyl) phthalate	117-82-8
Bis(2-methoxymethyl) adipate	106-06-3
Bis(2-n-butoxyethyl) phthalate	117-83-9
Bis(2-phenoxyethyl) ether	622-87-7
Bis(4-chlorobutyl) ether	6334-96-9
Bis(chloromethyl) ether	542-88-1
2-Bromomethyl ethyl ether	13057-17-5
beta-Bromophenetole	589-10-6
o-Bromophenetole	583-19-7
p-Bromophenetole	588-96-5
3-Bromopropyl phenyl ether	588-63-6
2-Butenal (Crotonaldehyde)	4170-30-3
Butyl ethyl ether	628-81-9
tert-Butyl glycidyl ether	7665-72-7
tert-Butyl methyl ether	1634-04-0
n-Butyl phenyl ether	1126-79-0
n-Butyl vinyl ether	11-34-2
Chloroacetaldehyde diethylacetal	621-62-5
1-(2-Chloroethoxy)-2-phenoxyethane	2243-49-91
2-Chloroethyl vinyl ether	110-75-8
Chloroethylene	75-01-4
Chloromethyl methyl ether	107-30-2
2-Chorophenetole	614-72-2
4-Chlorophenetole	622-61-7
Cyclooctene	931-88-4
Cyclopropyl methyl ether	540-47-6
Diallyl ether	557-40-4
p-Di-n-butoxybenzene	104-36-9
1,2-Dibenzyloxyethane	622-22-0
p-Dibenzyloxybenzene	621-91-0
Dibutyl ether	142-96-1

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1,2-Dichloroethyl ethyl ether	623-46-1
2,4-Dichlorophenetole	5392-86-9
Diethoxymethane	462-95-3
2,2-Diethoxypropane	126-84-1
Diethyl ethoxymethylenemalonate	87-13-8
Diethyl fumarate	623-91-6
Diethylketene	99-22-0
m-Diethoxybenzene	2049-73-2
o-Diethoxybenzene	2050-46-6
p-Diethoxybenzene	122-95-2
1,2-Diethoxyethane	629-14-1
3,3-Diethoxypropene	3054-95-3
2,3-Dihydrofuran	1191-99-7
2,5-Dihydrofuran	1708-29-8
Dimethoxymethane	109-87-5
1,1-Dimethoxyethane	534-15-6
1,2-Dimetoxypropan	7778-85-0
3,3-Dimethoxypropene	6044-68-4
Dimethylketene	598-26-5
2,4-Dinitrophenetole	610-54-8
1,3-Dioxepane	505-65-7
Dipropyl ether	111-43-3
Di(1-propynyl) ether	
Di(2-propynyl) ether	6921-27-3
Di-n-propoxymethane	505-84-0
1,2-Epoxy-3-isopropoxypropane	4016-14-2
1,2-Epoxy-3-phenoxypropane	122-60-1
p-Ethoxyacetophenone	1676-63-7
1-(2-Ethoxyethoxy)ethyl acetate	
2-(2-ethoxyethoxy)ethyl acetate	112-15-2
2-Ethoxyethyl acetate	111-15-9
(2-Ethoxyethyl)-a-benzoyl benzoate	
1-Ethoxynaphthalene	5328-01-8
o-Ethoxyphenyl isocyanate	5395-71-1
p-Ethoxyphenyl isocyanate	32459-62-4
1-Ethoxy-2-propyne	628-33-1
3-Ethoxypropionitrile	2141-62-0
2-Ethylacrylaldehyde oxime	99705-27-8
2-Ethylbutanal	97-96-1
2-Ethylbutanol	97-95-0
Ethyl-3-ethoxypropionate	763-69-9

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2-Ethylhexanal	123-05-7
Ethyl isopropyl ether	67000-01-5
Ethyl propenyl ether	928-55-2
2-Furaldehyde	98-01-01
2,5-Hexadiyn-1-ol	28255-99-4
4,5-Hexadien-2-yn-1-ol	2749-79-3
2,4-Hexadienal	80466-34-8
2-Hexenal	505-57-7
n-Hexyl ether	112-58-3
2-Indanecarboxaldehyde	155932-36-8
2-Iodophenetole	533-58-4
4-Iodophenetole	699-08-1
Isoamyl benzyl ether	122-73-6
Isoamyl ether	544-01-4
Isobutyl vinyl ether	109-53-5
Isophorone	78-59-1
b-Isopropoxypropionitrile	110-47-4
2-Isopropylacrylaldehyd oxime	
Isopropyl-2,4,5-trichlorophenoxy acetate	93-78-7
Limonene	5989-27-5
1,5-*p*-Menthadiene	99-83-2
1,5-p-Methadiene	
3-Methoxy-1-butyl acetate	4435-53-4
2-Methoxyethanol	109-86-4
3-Methoxyethyl acetate	
2-Methoxyethyl vinyl ether	1663-35-0
Methoxy-1,3,5,7-cyclooctatetraene	7176-89-8
3-Methoxypropionitrile	110-67-8
3-Methylbutanal; (Methylbutyraldehyde, Isovaleraldehyde)	590-86-3
2-3-Methyl-2-methylenebutanal (isopropylacrylaldehyde)	4417-80-5
Methyl-p-(n-amyloxy)benzoate	
n-Methylphenetole	622-60-6
m-Methylphenetole	621-32-9
2-Methylpropanal (Isobutyraldehyde)	78-84-2
2-Methyltetrahydrofuran	96-47-9
m-Nitrophenetole	621-52-3
1-Octene	111-66-0
Oxybis(2-ethyl acetate)	628-68-2
Oxybis(2-ethyl benzoate)	120-55-8
b,b-Oxydipropionitrile	1656-48-0

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1-Pentene	109-67-1
Phenoxyacetyl chloride	701-99-5
a-Phenoxypropionyl chloride	122-35-0
Phenyl-o-propyl ether	622-85-5
p-Phenylphenetone	
3-Phenylpropenal; (Cinnamaldehyde)	104-55-2
3- Phenyl-2-pentylpropenal; (α-Pentylcinnamaldehyde)	122-40-7
Propanal	123-38-6
n-Propyl isopropyl ether	627-08-7
Sodium 5,8,11,14-eicosatetraenoate	6610-25-9
Sodium ethoxyacetylide	73506-39-5
Tetraglycidyl ether/methylene-p-dianiline adduct	28768-32-3
Tetrahydropyran	142-68-7
Tridecanal	10486-19-8
Triethylene glycol diacetate	111-21-7
Triethylene glycol dipropionate	141-34-4
1,3,3-Trimethoxypropene	17576-35-1
1,1,2,3-Tetrachloro-1,3-butadiene	1637-31-6
4-Vinyl cyclohexene	100-40-3
Vinylene carbonate	872-36-6

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Appendix 2 Peroxidizable compounds sorted by CAS number

By CAS-no Class A, B, C, D

There are a few groups and chemicals listed without CAS no. They are listed at the end. See appendix 1 for instructions for each class.

Class	Chemical	CAS
Class D	4-Vinyl cyclohexene	100-40-3
Class C	Styrene	100-42-5
Class C	4-Vinyl pyridine	100-43-6
Class B	Benzyl alcohol	100-51-6
Class C	2-Vinyl pyridine	100-69-6
Class D	Benzyl ether; (dibenzyl ether)	103-50-4
Class D	p-Di-n-butoxybenzene	104-36-9
Class D	3-Phenylpropenal; (Cinnamaldehyde)	104-55-2
Class D	Tridecanal	10486-19-8
Class B	1,1-Diethoxyethane	105-57-7
Class D	Bis(2-methoxymethyl) adipate	106-06-3
Class D	1-Allyloxy-2,3-epoxypropane	106-92-3
Class C	Butadiene (*gas*)	106-99-0
Class A	Butadiene	106-99-0
Class D	Acrolein	107-02-8
Class C	Acrylonitrile	107-13-1
Class D	Chloromethyl methyl ether	107-30-2
Class C	Vinyl acetate	108-05-4
Class B	Methyl isobutyl ketone	108-10-1
Class B	4-methyl-2-pentanol	108-11-2
Class A	Diisopropyl ether	108-20-3
Class B	Cyclohexanol	108-93-0
Class D	Bis(2-ethoxyethyl) adipate	109-44-4
Class D	Isobutyl vinyl ether	109-53-5
Class D	1-Pentene	109-67-1
Class D	2-Methoxyethanol	109-86-4
Class D	Dimethoxymethane	109-87-5
Class B	Ethyl vinyl ether	109-92-2
Class B	Tetrahydrofuran	109-99-9
Class B	Furan	110-00-9
Class D	b-Isopropoxypropionitrile	110-47-4
Class D	3-Methoxypropionitrile	110-67-8

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Class B	Etylene glycol dimethyl ether; ('glyme')	110-71-4
Class B	2-Chloroethyl vinyl ether	110-75-8
Class B	2-Ethoxyethenol; (Ethylene glycol dimethyl ether ‘cellosolves’)	110-80-5
Class B	Cyclohexene	110-83-8
Class B	3,4-Dihydro-2H-pyran	110-87-2
Class D	2-Ethoxyethyl acetate	111-15-9
Class D	Triethylene glycol diacetate	111-21-7
Class B	Butyl vinyl ether	111-34-2
Class D	Dipropyl ether	111-43-3
Class D	Bis(2-chloroethyl) ether	111-44-4
Class D	1-Octene	111-66-0
Class B	Diethylene glycol dimethyl ether; (‘diethylene glycol’, ‘diglyme’)	111-96-6
Class D	2-(2-ethoxyethoxy)ethyl acetate	112-15-2
Class D	1,2-Bis(2-chloroethoxyl)ethane	112-26-5
Class D	Bis(2-ethoxyethyl)ether	112-36-7
Class A+B	Triethylene glycol dimethyl ether	112-49-2
Class D	n-Hexyl ether	112-58-3
Class D	n-Butyl phenyl ether	1126-79-0
Class A+B	2-Methoxypropene	116-11-0
Class A	Tetrafluoroethylene	116-14-3
Class C	Tetrafluoroethylene *(gas)*	116-14-3
Class D	Bis(2-methoxyethyl) phthalate	117-82-8
Class D	Bis(2-n-butoxyethyl) phthalate	117-83-9
Class D	2,3-Dihydrofuran	1191-99-7
Class B	Tetrahydronaphthalene	119-64-2
Class D	Oxybis(2-ethyl benzoate)	120-55-8
Class D	a-Phenoxypropionyl chloride	122-35-0
Class D	3- Phenyl-2-pentylpropenal; (α-Pentylcinnamaldehyde)	122-40-7
Class D	1,2-Epoxy-3-phenoxypropane	122-60-1
Class D	Isoamyl benzyl ether	122-73-6
Class D	p-Diethoxybenzene	122-95-2
Class D	2-Ethylhexanal	123-05-7
Class D	Propanal	123-38-6
Class B	3-methyl-1 butanol	123-51-3
Class B	Dioxanes part 1,4-Dioxane	123-91-1
Class D	2,2-Diethoxypropane	126-84-1
Class A	Chloroprene	126-99-8
Class C	2-chlorobutadiene	126-99-8
Class D	2-Bromomethyl ethyl ether	13057-17-5
Class D	Triethylene glycol dipropionate	141-34-4

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Class B	Cyclopentene	142-29-0
Class D	Tetrahydropyran	142-68-7
Class D	Dibutyl ether	142-96-1
Class D	Bis(2-(methoxyethoxy)ethyl) ether	143-24-8
Class D	2-Indanecarboxaldehyde	155932-36-8
Class D	tert-Butyl methyl ether	1634-04-4
Class D	1,1,2,3-Tetrachloro-1,3-butadiene	1637-31-6
Class D	b,b-Oxydipropionitrile	1656-48-0
Class B	2-Methoxyethyl vinyl ether	1663-35-0
Class D	p-Ethoxyacetophenone	1676-63-7
Class B	Tetrahydrofuran-d8	1693-74-9
Class D	2,5-Dihydrofuran	1708-29-8
Class A	Potassium amide	17242-52-3
Class D	Allyl phenyl ether	1746-13-0
Class D	1,3,3-Trimethoxypropene	17576-35-1
Class B	1,4-Dioxan-d8	17647-74-4
Class D	m-Diethoxybenzene	2049-73-2
Class D	o-Diethoxybenzene	2050-46-6
Class D	3-Ethoxypropionitrile	2141-62-0
Class B	Cyklohexyl vinyleter	2182-55-0
Class D	1-(2-Chloroethoxy)-2-phenoxyethane	2243-44-9
Class B	Diethylether-d10, Ether-d10	2679-89-2
Class D	4,5-Hexadien-2-yn-1-ol	2749-79-3
Class D	2,5-Hexadiyn-1-ol	28255-99-4
Class D	Tetraglycidyl ether/methylene-p-dianiline adduct	28768-32-3
Class D	3,3-Diethoxypropene	3054-95-3
Class D	p-Ethoxyphenyl isocyanate	32459-62-4
Class D	p-(n-Amyloxy)benzoyl chloride	36823-84-4
Class B	1,4-Butanediol divinyl ether	3891-33-6
Class D	1,2-Epoxy-3-isopropoxypropane	4016-14-2
Class D	2-Butenal (Crotonaldehyde)	4170-30-3
Class D	2-3-Methyl-2-methylenebutanal; (Isopropylacrylaldehyde)	4417-80-5
Class D	3-Methoxy-1-butyl acetate	4435-53-4
Class B	3-Hydroxytetrahydrofuran	453-20-3
Class B	Diacetylene; (Butadiyne)	460-12-8
Class D	Diethoxymethane	462-95-3
Class D	2-Hexenal	505-57-7
Class D	1,3-Dioxepane	505-65-7
Class D	Di-n-propoxymethane	505-84-0

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Class D	1-Ethoxynaphthalene	5328-01-8
Class D	2-Iodophenetole	533-58-4
Class D	1,1-Dimethoxyethane	534-15-6
Class C	Acrylonitrile-d3	53807-26-4
Class D	Benzyl methyl ether	538-86-3
Class D	2,4-Dichlorophenetole	5392-86-9
Class D	Benzyl ethyl ether	539-30-0
Class D	o-Ethoxyphenyl isocyanate	5395-71-1
Class D	Cyclopropyl methyl ether	540-47-6
Class D	Bis(chloromethyl) ether	542-88-1
Class D	Isoamyl ether	544-01-4
Class D	Allyl ethyl ether	557-31-3
Class D	Diallyl ether	557-40-4
Class D	o-Bromophenetole	583-19-7
Class D	3-Bromopropyl phenyl ether	588-63-6
Class D	Benzyl n-butyl ether	588-67-0
Class D	p-Bromophenetole	588-96-5
Class D	beta-Bromophenetole	589-10-6
Class B	4-heptanol	589-55-9
Class D	3-Methylbutanal; (Methylbutyraldehyde, Isovaleraldehyde)	590-86-3
Class D	Dimethylketene	598-26-5
Class D	Limonene	5989-27-5
Class B	2-phenylethanol	60-12-8
Class B	Diethyl ether	60-29-7
Class B	2-pentanol	6032-29-7
Class C	2-pentanol	6032-29-7
Class D	3,3-Dimethoxypropene	6044-68-4
Class D	Benzyl-1-napthyl ether	607-58-9
Class D	2,4-Dinitrophenetole	610-54-8
Class D	2-Chorophenetole	614-72-2
Class D	m-Methylphenetole	621-32-9
Class D	m-Nitrophenetole	621-52-3
Class D	Chloroacetaldehyde diethylacetal	621-62-5
Class D	p-Dibenzyloxybenzene	621-91-0
Class D	1,2-Dibenzyloxyethane	622-22-0
Class D	n-Methylphenetole	622-60-6
Class D	4-Chlorophenetole	622-61-7
Class D	Phenyl-o-propyl ether	622-85-5
Class D	Bis(2-phenoxyethyl) ether	622-87-7
Class D	1,2-Dichloroethyl ethyl ether	623-46-1

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Class D	Diethyl fumarate	623-91-6
Class D	Bis(2-methoxyethyl) carbonate	626-84-6
Class B	2-hexanol	626-93-7
Class D	n-Propyl isopropyl ether	627-08-7
Class B	Methyl propargyl ether	627-41-8
Class A	Butyl methyl ether	628-28-4
Class B	Butyl methyl ether	628-28-4
Class D	1-Ethoxy-2-propyne	628-33-1
Class D	Oxybis(2-ethyl acetate)	628-68-2
Class D	Butyl ethyl ether	628-81-9
Class D	1,2-Diethoxyethane	629-14-1
Class D	Bis(4-chlorobutyl) ether	6334-96-9
Class D	Sodium 5,8,11,14-eicosatetraenoate	6610-25-9
Class D	Ethyl isopropyl ether	67000-01-5
Class B	2-propanol; (isoproranol, “IPA”)	67-63-0
Class C	Vinyl acetylene; (Buten-3-yne) *(gas)*	689-97-4
Class D	Di(2-propynyl) ether	6921-27-3
Class D	Arachidonic-5,6,8,9,11,12,14,15-d8 acid	69254-37-1
Class D	n-Amyl ether	693-65-2
Class D	4-Iodophenetole	699-08-1
Class D	Phenoxyacetyl chloride	701-99-5
Class D	Methoxy-1,3,5,7-cyclooctatetraene	7176-89-8
Class D	Sodium ethoxyacetylide	73506-39-5
Class B	Propyne; Methyl acetylene	74-99-7
Class A	Potassium metal	7440-09-7
Class C	Vinyl chloride *(gas)*	75-01-4
Class D	Chloroethylene	75-01-4
Class B	Acetaldehyde	75-07-0
Class A+C	Vinylidene chloride; (1,1-Dichloroethylene)	75-35-4
Class A+C	1,1-Dichloroethylene	75-35-4
Class D	Ethyl-3-ethoxypropionate	763-69-9
Class D	tert-Butyl glycidyl ether	7665-72-7
Class B	Dicyclopentadiene	77-73-6
Class D	1,2-Dimetoxypropan	7778-85-0
Class A	Sodium amide	7782-92-5
Class D	Isophorone	78-59-1
Class D	2-Methylpropanal; (Isobutyraldehyde)	78-84-2
Class B	2-Butanol	78-92-2
Class C	Acrylic acid	79-10-7

Stockholms universitet

Class C	Chlorotrifluoroethylene *(gas)*	79-38-9
Class D	2,4-Hexadienal	80466-34-8
Class C	Methyl methacrylate	80-62-6
Class A	Divinyl acetylene	821-08-9
Class B	4-penten-1-ol	821-09-0
Class B	2- Cyclohexene-1-ol	822-67-3
Class D	Diethyl ethoxymethylenemalonate	87-13-8
Class D	Vinylene carbonate	872-36-6
Class B	Decahydronaphthalene; (Decalin)	91-17-8
Class B	1,2-Chloro-1-butanol	928-51-8
Class D	Ethyl propenyl ether	928-55-2
Class D	Cyclooctene	931-88-4
Class D	Isopropyl-2,4,5-trichlorophenoxy acetate	93-78-7
Class B	Methyl cyclopentane	96-37-7
Class D	2-Methyltetrahydrofuran	96-47-9
Class D	2-Ethylbutanol	97-95-0
Class D	2-Ethylbutanal	97-96-1
Class D	2-Furaldehyde	98-01-1
Class B	Cumene	98-82-8
Class B	1-phenylethanol	98-85-1
Class D	Diethylketene	99-22-0
Class D	2-Ethylacrylaldehyde oxime	99705-27-8
Class D	1,5-p-Menthadiene; (α-Phellandrene)	99-83-2
Class B	Vinyl ethers	
Class B	Other secondary alcohols	
Class D	Di(1-propynyl) ether	
Class D	1-(2-Ethoxyethoxy)ethyl acetate	
Class D	(2-Ethoxyethyl)-a-benzoyl benzoate	
Class D	2-Isopropylacrylaldehyd oxime	
Class D	1,5-p-Methadiene	
Class D	3-Methoxyethyl acetate	
Class D	Methyl-p-(n-amyloxy)benzoate	
Class D	p-Phenylphenetone	

Appendix 3 Sign to be posted on cabinets containing peroxidizable compounds

See next page

Next page should be posted on the cabinet together with the complete routine.

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There are known potential peroxide forming chemicals stored in this cabinet

Chemical name	Peroxide former category (see list)
	☐ A ☐ B ☐ C ☐ D
	☐ A ☐ B ☐ C ☐ D
	☐ A ☐ B ☐ C ☐ D
	☐ A ☐ B ☐ C ☐ D
	☐ A ☐ B ☐ C ☐ D
	☐ A ☐ B ☐ C ☐ D

Testing frequency: A: every 3 months, B: every 12 months, C: every 6 months, D: check SDS

Quick-guide

For more information see the Routine for potentially peroxide forming chemicals attached here.

On arrival always visually inspect the container that it is in good condition. Mark it with the label for peroxide forming chemicals, fill in the arrival data.

Before taking it out or moving the container always do a visual inspection before touching it. If it is ok, check the dates on the label if it needs peroxide testing before use.

Visual inspection:

- Is the container in good condition? (No deformation cracks etc.)
- Is the container and cap is free of crystals (DO NOT OPEN TO DETERMINE THIS)?
- Is the container is free of stratification, cloudiness & wisp-like structures?

If any of the answers is 'No' do not touch/ move the container. Contact the University's hazardous waste contractor and inform your local laboratory safety coordinator.

N.B. Even with strong peroxide formation it is not dangerous if the chemical is not disturbed!

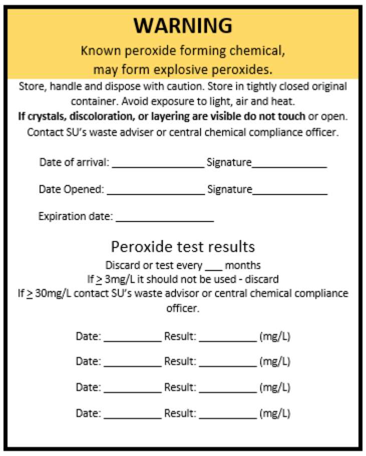
Container Label

The label is to be printed and put on/attached to the container in a suitable size.

Do not put a string close to the lid. Any spill can dry up and form/deposit peroxide crystals on the string.

Do not cover any important information on the original container.

The label can be requested from the local laboratory safety coordinator.



WARNING

Known peroxide forming chemical,
may form explosive peroxides.

Store, handle and dispose with caution. Store in tightly closed original container. Avoid exposure to light, air and heat.
If crystals, discoloration, or layering are visible do not touch or open.
Contact SU's waste adviser or central chemical compliance officer.

Date of arrival: ______________ Signature____________

Date Opened: ______________ Signature____________

Expiration date: ______________

Peroxide test results

Discard or test every ___ months
If $\geq$ 3mg/L it should not be used - discard
If $\geq$ 30mg/L contact SU's waste advisor or central chemical compliance officer.

Date: _________ Result: _________ (mg/L)

Date: _________ Result: _________ (mg/L)

Date: _________ Result: _________ (mg/L)

Date: _________ Result: _________ (mg/L)

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Appendix 4 Label for containers with peroxidizable compounds.

WARNING

Known peroxide forming chemical,
may form explosive peroxides.

Store, handle and dispose with caution. Store in tightly closed original container. Avoid exposure to light, air and heat.
If crystals, discoloration, or layering are visible do not touch or open. Contact SU's waste adviser or central chemical compliance officer.

Date of arrival: ________________ Signature_____________

Date Opened: _________________ Signature_____________

Expiration date: _________________

Peroxide test results

Discard or test every ___ months
If ≥ 3mg/L it should not be used - discard
If ≥ 30mg/L contact SU's waste advisor or central chemical compliance officer.

Date: __________ Result: __________ (mg/L)

Date: __________ Result: __________ (mg/L)

Date: __________ Result: __________ (mg/L)

Date: __________ Result: __________ (mg/L)