

## **Chemical Risk Management Protocol**

### **Safe Methods of Use (SMOU)**

# **Class 5.2 Organic Peroxides**

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## 1 Purpose

This Safe Method of Use (SMOU) applies to principal investigators (PIs), laboratory managers, designated laboratory persons (DLPs), and all staff and students who direct or participate in the use of Class 5.2 Organic Peroxides at the University of Auckland.

## 2 Disclaimer

The Safety Data Sheet (SDS) should be consulted for specific information about the chemical you will be using. The Gold FFX SDS Database is available on the Library database. Instructions on how to source this information can be found on the Health, Safety and Wellbeing Databases website:

<https://www.auckland.ac.nz/en/health-safety-wellbeing/health-safety-topics/laboratory-safety/chemical-safety/databases.html>

**Please read this SMOU in conjunction with the Chemical Risk Management Guidelines.**

Note: 'Shall' denotes a mandatory requirement and 'should' denotes a recommendation.

## 3 Classification

This SMOU covers the use of UN Class 5.2 Organic Peroxides. See Appendix 1 for further information. In the other chemical classification systems of NZ, this includes:

HSNO Class	Corresponding GHS 7 Class
5.2 A-G	Organic peroxide Type A-G

## 4 Warning

**Organic peroxides are as a rule extremely unstable.** Many of them are highly reactive and need to be stored in temperature-controlled areas. In their pure form they can be shock-sensitive explosives.

## 5 Incompatibilities

Class 5.2 Organic peroxides shall NOT be stored with Class 2 flammable gases or aerosols, Class 3.1 Flammable Liquids, Class 4 Reactive solids, or Class 5.1 Oxidisers.

## 6 Storage

Organic peroxides shall be stored separately from any other chemical class in cool well-ventilated stores. In the absence of a separate store, this can be achieved by storing containers in a segregation device like a sealable plastic box within the store.

Organic peroxides shall be stored well away from any other flammable or combustible material. Some organic peroxides shall be stored below set temperatures.

Single containers stored in refrigerators should be inside a segregation device (such as a sealable plastic box)

## 7 Disposal

Disposal of UN Class 5.2 chemicals shall be undertaken by a licensed chemical waste contractor.

- Please contact the Chemical Safety advisor for advice about disposal.
- Class 5.2 chemicals shall be packed separately for disposal.

## 8 Spill

Refer to the Chemical Risk Management Protocol Guideline ["2. Using Chemicals"](#) section 11 and the specific SDS for full spill response instructions.

- Use correct gloves
- If liquid, use absorbent material in spill kits to wipe up – wiping from outside of spill toward centre.
- Place used absorbent material in impermeable/airtight container
- Solids can be placed directly in an impermeable/airtight container
- Inform Laboratory Manager and arrange for immediate disposal

## Appendix 1: UN Class 5.2 – Peroxides

The Globally Harmonized System (GHS) of classification and labelling of chemicals has seven categories for organic peroxides, which are described below.

Type A – An organic peroxide as packaged that can detonate or deflagrate rapidly

Type B – An organic peroxide as packaged that does not detonate or deflagrate rapidly but is capable of undergoing a thermal explosion

Type C – An organic peroxide as packaged that possesses explosive properties but will not detonate, deflagrate or thermally explode

Types D through F – Organic peroxides that have shown hazards such as partial detonation, etc., when tested in a laboratory but do not possess these hazards as packaged.

### **Representative list of organic peroxides and their classification (not exhaustive- consult the SDS)**

<b>Chemical</b>	<b>Type of peroxide (HSNO Category)</b>
Acetyl acetone peroxide	Type D, Liquid
Acetyl benzoyl peroxide	Type D, Liquid
tert-Butyl hydroperoxide 70-90%	Type C, Liquid
tert-Butyl hydroperoxide <80%	Type D, Liquid
tert-Butyl peroxyacetate 52-77%	Type B, Liquid
tert-Butyl peroxyacetate 32-52%	Type C, Liquid
tert-Butyl peroxybenzoate 77-100%	Type C, Liquid
tert-Butyl peroxybenzoate 52-77%	Type D, Liquid
tert-Butyl peroxy-2-ethylhexanoate 52-100%	Type C, Liquid, Temperature controlled
tert-Butyl peroxy-2-ethylhexanoate 32-52%	Type E, Liquid, Temperature controlled
tert-Butyl peroxy-2-methylbenzoate	Type C, Liquid
tert-Butyl peroxy-pivalate	Type C, Liquid, Temperature controlled
tert-Butyl peroxy-3,5,5-trimethylhexanoate	Type D, Liquid
3-chloroperoxybenzoic acid	Type B, Solid
Cumyl hydroperoxide	Type E, Liquid
Cyclohexanone peroxide	Type C, Solid
1,1-Di-(tert-butylperoxy)-3,5,5-trimethylcyclohexane	Type B, Liquid

Di-2,4-Dichlorobenzoyl peroxide	Type B, Solid
Diacetyl peroxide	Type D Liquid, Temperature controlled
Dibenzoyl peroxide (Benzoyl peroxide), 77-100%	Type B, Solid
Dibenzoyl peroxide (Benzoyl peroxide), <77%	Type C, Solid
Di-tert-butyl peroxide	Type E, Liquid
Di-4-chlorobenzoyl peroxide	Type B, Solid
Dicumyl peroxide	Type F, Solid
Di(2-ethylhexyl) peroxydicarbonate	Type C Liquid, Temperature controlled
2,5-Dimethyl-2,5-Di-(tert-butylperoxy)hexane	Type D, Liquid
Diisobutyryl peroxide	Type B, Liquid, Temperature controlled
2,5 Dimethyl-2,5-Di-(Benzoylperoxy) hexane	Type D, Liquid
Di-(3,5,5-Trimethylhexanoyl) peroxide	Type D, Liquid, Temperature controlled
ethyl 3,3-Di(tert-Butylperoxy)Butyrate	Type C, Liquid
Methyl ethyl ketone peroxide	Type D, Liquid
Methyl isobutyl ketone peroxide	Type D, Liquid
Peroxyacetic acid	Type D, Liquid