

# UWL Particularly Hazardous Substance (PHS) Prior Approval Form

The Principal Investigator (PI) or other person in authority for a lab shall complete this Prior Approval form for use of Particularly Hazardous Substances (PHS's). At UWL PHS's include select carcinogens, reproductive toxins, hazardous chemicals with a high degree of acute toxicity, explosives, self/water reactive, and pyrophoric chemicals. Responsibility for determining if a hazardous chemical is a PHS rests solely with the PI or other person in authority in a lab.

See the end of this form for the definition of PHS and other guidance. The guidance includes a method, using a Hazard "H" code on a Safety Data Sheet (SDS), to determine that a chemical meets the PHS definition.

The applicant can complete a separate form for each chemical. As an alternate, chemicals can be grouped into similar hazard categories as long as the hazards and hazard controls are identical. To complete this alternate option, attach a list of chemicals that apply to this Prior Approval Form. If using this hazard group option, insert "See attached chemical list" in section 1.A. Chemical name.

Contact Environmental Health and Safety (EH&S) for assistance or questions with completing this form.

## 1. Substance Information

A. Chemical name: \_\_\_\_\_

B. CAS#: \_\_\_\_\_

C. Physical State: \_\_\_\_\_

D. SDS Hazard "H" Code(s): \_\_\_\_\_

E. Estimated Use Duration: \_\_\_\_\_ (hours/day)      Frequency: \_\_\_\_\_ (days/year)

## 2. Procedure: Briefly describe how the material will be used.

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## 3. Exposure Controls

### A. Ventilation/Isolation *(circle all that apply)*

1. Exhausted Lab Hood

2. Glove Box

3. HEPA Filtered Massing Enclosure

4. Vented Gas Cabinet

5. Blast Shield

6. Snorkel: Point Exhaust

7. Others: \_\_\_\_\_

### B. Personal Protective Equipment (PPE) *(circle all that apply)*

1. Safety Glasses

2. Chemical Goggles

3. Face Shield

4. Gloves

5. Standard Lab Coat

6. Flame Resistant Lab Coat

7. Apron

8. Footwear

9. Respirator *(Require EH&S approval)*

10. Other: \_\_\_\_\_

4. **Location of Proposed Use/Designated Area** (circle all that apply)

A. Building: 1. PSSC 2. Cowley 3. HSC

B. Provide Room Numbers by Building and Identify Location(s) where Substance(s) will be used.

(A Designated Area can be an entire lab or location within a lab. Designated Area signage is required and is available from EH&S).

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5. **Spills, Decontamination, and Waste Disposal**

A. Spill control materials readily available Yes No

B. Reviewed and can implement Part E: Emergency Procedures as described in *UWL Laboratory Safety and Chemical Disposal Guide*. The *Guide* is available from EH&S. Yes No

C. Decontamination Methods: (circle all that apply)

1. Physical Cleaning 2. Lab Bench Mat/Liner Pad 3. Spill Tray  
4. Evaporation 5. Dispose Contaminated Items 6. Chemical Inactivation

7. Other: \_\_\_\_\_

D. Disposal (circle all that apply)

1. Benchtop Neutralization 2. Deactivation 3. Fully Consumed/No Waste  
4. Dispose through EH&S 5. Other: \_\_\_\_\_

6. **Approval**

The Principal Investigator (PI) or the person in authority for an instructional lab at the time of use of PHS's identified by this form has demonstrated an understanding of the hazards of the PHS's and plans to handle the PHS's in a manner that minimizes risk to health and safety. The individual(s) signing this form are authorized to use and supervise/manage the use by other personnel in the lab who they authorize to use the substance(s) in the manner described.

\_\_\_\_\_  
Printed Name:  
PI or Other Person in Authority

\_\_\_\_\_  
Printed Name:  
PI or Other Person in Authority

\_\_\_\_\_  
Printed Name:  
UWL or Dept. Chemical Hygiene Officer

\_\_\_\_\_  
Signature:

\_\_\_\_\_  
Signature:

\_\_\_\_\_  
Signature:

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Date:

# Using This Form

## Identifying Particularly Hazardous Substances

There is no comprehensive list of PHS, but there are different ways to determine if a chemical is a PHS.

1. Use the Hazard "H" code on a Safety Data Sheet (SDS), to determine that a chemical meets the PHS definition. See the appended list of Hazard "H" codes.
2. The OSHA Laboratory Standard defines particularly hazardous substances as:

**Carcinogens** – A carcinogen is a substance capable of causing cancer. Carcinogens are chronically toxic substances; that is, they cause damage after repeated or long-duration exposure, and their effects may become evident only after a long latency period. A chemical is considered a carcinogen if it is included in any of the following carcinogen lists:

- OSHA-regulated carcinogens as listed in Subpart Z of the [OSHA standards](https://www.osha.gov/SLTC/carcinogens/standards.html).  
<https://www.osha.gov/SLTC/carcinogens/standards.html>
- Under the category "known to be carcinogens" in the *Annual Report of Carcinogens* published by the [National Toxicology Program](https://ntp.niehs.nih.gov/whatwestudy/assessments/cancer/index.html) (NTP) latest edition. <https://ntp.niehs.nih.gov/whatwestudy/assessments/cancer/index.html>
- Group 1 ("carcinogenic to humans") of the [International Agency for Research on Cancer \(IARC\)](https://monographs.iarc.fr/agents-classified-by-the-iarc/), latest edition. Chemicals listed in Group 2A or 2B ("reasonably anticipated to be carcinogens") that cause significant tumor incidence in experimental animals under specified conditions are also considered carcinogens under the OSHA Laboratory Standard.  
<https://monographs.iarc.fr/agents-classified-by-the-iarc/>

**Reproductive Toxins** – Reproductive toxins are substances that have adverse effects on various aspects of reproduction, including fertility, gestation, lactation, and general reproductive performance. When a pregnant woman is exposed to a chemical, the fetus may be exposed as well because the placenta is an extremely poor barrier to chemicals. Reproductive toxins can affect both men and women. Male reproductive toxins can in some cases lead to sterility.

**Substances with a High Acute Toxicity** – High acute toxicity includes any chemical that falls within any of the following OSHA-defined categories:

- A chemical with a median lethal dose (LD<sub>50</sub>) of 50 mg or less per kg of body weight when administered orally to certain test populations.
- A chemical with an LD<sub>50</sub> of 200 mg less per kg of body weight when administered by continuous contact for 24 hours to certain test populations.
- A chemical with a median lethal concentration (LC<sub>50</sub>) in air of 200 parts per million (ppm) by volume or less of gas or vapor, or 2 mg per liter or less of mist, fume, or dust, when administered to certain test populations by continuous inhalation for one hour, provided such concentration and/or condition are likely to be encountered by humans when the chemical is used in any reasonably foreseeable manner.

**Explosives** – Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion, i.e., with substantially instantaneous release of gas and heat, unless such compound, mixture, or device is otherwise specifically classified by the U.S. Department of Transportation; see 49 CFR chapter I. The term "explosives" shall include all material which is classified as Class A, Class B, and Class C explosives by the U.S. Department of Transportation, and includes, but is not limited to dynamite, black powder, pellet powders, initiating explosives, blasting caps, electric blasting caps, safety fuse, fuse lighters, fuse igniters, squibs, corded detonator fuse, instantaneous fuse, igniter cord, igniters, small arms ammunition, small arms ammunition primers, smokeless propellant, cartridges for propellant-actuated power devices, and cartridges for industrial guns..

**Self-reactive** – Self-reactive chemicals are thermally unstable liquid or solid substances liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances classified as explosives, organic peroxides, oxidizing liquids or oxidizing solids.

**Water-reactive** chemicals are those that spontaneously undergo a chemical reaction with water, as they are highly reducing in nature. Examples include alkali metals, sodium through cesium, and alkaline earth metals, magnesium through barium.

**Pyrophoric chemical** – are liquids, solids, and gases that will ignite spontaneously in air at or below 130 °F. Oxidation of the compound by oxygen or moisture in air proceeds so rapidly that ignition occurs.

## Globally Harmonized System (GHS)

### Hazard “H” Codes for Particularly Hazardous Substances (PHS)

Safety data sheets (SDS) now include hazard “H” codes” (in SDS Section 2: Hazards Identification) which correspond to hazard classifications under the Globally Harmonized System (GHS). The codes can serve as a quick reference for determining how to safely use and handle chemicals. The same applies to determining if a chemical is a particularly hazardous substance (PHS). The following details the hazard categories, and their corresponding H Codes, which indicate that a chemical is a PHS.

#### **Explosives: (include GHS # H200, H201, H202, H203, H204, H205, H230, H231, H240, H241, H271)**

Examples: Dinitrophenol • Heavy Metal Azides • Trinitroaniline • 2,4,6-Trinitrophenol (picric acid)

#### **Self-Reactive Substances: (include GHS # H251)**

Examples: Acrylonitrile • Cyclopentadiene • Ethyl Acrylate • Perchloric Acid Solutions (over 72.5% by weight) • Picric Acid

#### **Pyrophoric Liquids and Solids: (include GHS # H250)**

Examples: n-Butyllithium • t-Butyllithium • Dichloromethylsilane • Diethylzinc • Organoaluminum Compounds • Raney Nickel Catalyst • Sodium Hydride

#### **Water-Reactive Chemicals: (include GHS # H260, H261)**

Examples: Calcium Hydride • Cesium • Lithium • Lithium Aluminum Hydride • Magnesium • Potassium • Potassium Hydride • Sodium

#### **Acute Toxicity: (include GHS # H300, H304, H310, H330, H370 and/or H371)**

Examples: Bromine • Hydrofluoric Acid • Potassium Cyanide • Sodium Azide • Sodium Cyanide • Methanol

#### **Select Carcinogens: (include GHS # H350, H351)**

Examples: Acetaldehyde • Acrylamide • Acrylonitrile • Aniline • Benzene • 1,3-Butadiene • Chloroform • Dichloromethane (methylene chloride) • Formaldehyde • Inorganic Compounds (Arsenic, Cadmium, Chromium) • Napthalene • Pentachlorophenol • Trichloroethylene

#### **Reproductive Toxicants: (include GHS # H340, H341, H360, H361, H361d, H361f)**

Examples: Acetaldehyde • Acid Dichromate Solution • Acridine Orange • Aniline • Benzene • Carbon Disulfide • Chloroform • Dimethyl Formamide • Ethidium Bromide • 2-Ethoxy Ethanol • Hexanes • Inorganic Compounds (Arsenic, Cadmium, Lead) • 2-Methoxy Ethanol • Toluene • Trichloroethylene

\*NOTE: This list merely provides a few examples for each PHS Category and the H codes used by GHS in identifying them. There are hundreds of known chemicals which are considered PHS and will have one or more of these H codes assigned to them and indicated on their SDS. Many chemicals fall under more than one category. Always check the SDS of the chemicals you wish to procure to see if they are a PHS and to ensure necessary safety considerations are addressed before you order/acquire them.

# List of GHS Hazard “H” Codes for Particularly Hazardous Substances (PHS)

## **Physical Hazards**

H200: Unstable explosive  
H201: Explosive; mass explosion hazard  
H202: Explosive; severe projection hazard  
H203: Explosive; fire, blast or projection hazard  
H204: Fire or projection hazard  
H205: May mass explode in fire  
H230: May react explosively even in the absence of air  
H231: May react explosively even in the absence of air at elevated pressure and/or temperature  
H240: Heating may cause an explosion  
H241: Heating may cause a fire or explosion  
H250: Catches fire spontaneously if exposed to air  
H251: Self-heating; may catch fire  
H260: In contact with water releases flammable gases which may ignite spontaneously  
H261: In contact with water releases flammable gas  
H271: May cause fire or explosion; strong oxidizer

## **Health Hazards**

H300: Fatal if swallowed  
H304: May be fatal if swallowed and enters airways  
H310: Fatal in contact with skin  
H330: Fatal if inhaled  
H340: May cause genetic defects  
H341: Suspected of causing genetic defects  
H350: May cause cancer  
H351: Suspected of causing cancer  
H360: May damage fertility or the unborn child  
H361: Suspected of damaging fertility or the unborn child  
H361d: Suspected of damaging the unborn child  
H361f: Suspected of damaging fertility  
H370: Causes damage to organs, single exposure  
H371: May cause damage to organs, single exposure