



# **RHODE ISLAND RIGHT-TO-KNOW PROGRAM**

Prepared by Triumvirate Environmental  
Reviewed and Updated  
October 2022

## Table of Contents

<b>1.0</b>	<b>Purpose</b> .....	<b>3</b>
<b>2.0</b>	<b>Scope</b> .....	<b>3</b>
2.1	Employee Rights .....	3
2.2	Materials Not Covered.....	4
2.3	Laboratory Setting .....	4
<b>3.0</b>	<b>Definitions</b> .....	<b>5</b>
<b>4.0</b>	<b>Responsibilities</b> .....	<b>8</b>
4.1	Right-to-Know Coordinator or Designee .....	8
4.2	Department Supervisor .....	9
4.3	Employees.....	9
4.4	Shipping & Receiving .....	9
<b>5.0</b>	<b>Hazardous Materials</b> .....	<b>9</b>
5.1	Chemical Identification Lists .....	9
5.2	Categories of Hazardous Chemicals .....	10
5.2.1	<i>Allergens and Sensitizers</i> .....	10
5.2.2	<i>Asphyxiants</i> .....	10
5.2.3	<i>Compressed Gases</i> .....	10
5.2.4	<i>Controlled Substances</i> .....	11
5.2.5	<i>Corrosive Chemicals</i> .....	11
5.2.6	<i>Cryogenic Liquids</i> .....	11
5.2.7	<i>Flammable and Combustible Chemicals</i> .....	11
5.2.8	<i>Hepatotoxins</i> .....	12
5.2.9	<i>Irritants</i> .....	12
5.2.10	<i>Nephrotoxins</i> .....	13
5.2.11	<i>Neurotoxins</i> .....	13
5.2.12	<i>Organic Peroxides</i> .....	13
5.2.13	<i>Oxidizers</i> .....	13
5.2.14	<i>Pyrophoric Chemicals</i> .....	14
5.2.15	<i>Reproductive Toxins</i> .....	14
5.2.16	<i>Select Carcinogens</i> .....	14
5.2.17	<i>Toxic Chemicals</i> .....	14
5.2.18	<i>Water-Reactive Chemicals</i> .....	15
<b>6.0</b>	<b>Safety Data Sheets (SDS)</b> .....	<b>15</b>
6.1	Requirements.....	15
6.2	Trade Secrets .....	16
6.3	Obsolete Materials .....	16
6.4	Internet Access to SDS .....	16
<b>7.0</b>	<b>Labeling</b> .....	<b>16</b>
7.1	Labels on Shipped Containers.....	16
7.2	Workplace Labeling .....	17
7.3	Portable Containers .....	17
7.4	Label Maintenance .....	17
7.5	Stationary Vessels.....	17
7.6	Piping Containing Hazardous Materials.....	17
7.7	Exemptions .....	17
<b>8.0</b>	<b>Training</b> .....	<b>18</b>

8.1	Employee Information and Training .....	18
<b>9.0</b>	<b>Contractor Requirements .....</b>	<b>19</b>
9.1	Rhode Island College Responsibilities .....	19
9.2	Departmental Responsibility .....	19
9.3	Contractor's Responsibility .....	19
<b>10.0</b>	<b>Non-Routine Tasks .....</b>	<b>19</b>
10.1	Non-Routine Evaluation Process .....	20
<b>11.0</b>	<b>Rhode Island Right-to-Know Law .....</b>	<b>20</b>
11.1	Annual Registration .....	20
<b>12.0</b>	<b>Recordkeeping .....</b>	<b>20</b>
12.1	Safety Data Sheets .....	20
12.2	Inventory .....	21
	<b>Appendix A: Emergency Contact List .....</b>	<b>22</b>
	<b>Appendix B: Hazardous Materials Inventory Form .....</b>	<b>23</b>
	<b>Appendix C: Reading and Understanding Safety Data Sheets .....</b>	<b>24</b>
	<b>Appendix D: Hazard Communication Standard GHS Pictograms .....</b>	<b>27</b>

## 1.0 Purpose

It is the goal of Rhode Island College (RIC) to reduce risk associated with hazardous materials and control risk to employees. The College has developed and implemented this Rhode Island Right-to-Know (RTK) Program which is designed to communicate hazards of chemicals used throughout the campus and appropriate preventive and protective measures to employees. This written program complies with the requirements of the current federal Occupational Safety and Health Administration (OSHA) Hazard Communication (HazCom) Standard (29 CFR 1910.1200), Rhode Island General Laws (RIGL) Chapter 28-21 Hazardous Substance Right-to-Know Act, and OSHA's Access to Employee Exposure Medical Records (29 CFR 1910.1020).

Revisions to the OSHA HazCom standard were finalized in March 2012. These changes include the adoption of the United Nations Globally Harmonized System (GHS) of Classification and Labelling of Chemicals. As a result, changes in labeling, Safety Data Sheets (SDS), and new training requirements were implemented in accordance with the effective dates set forth in the 2012 regulations. This Program conforms to the current OSHA standard and as appropriate incorporates and references the 2012 changes.

## 2.0 Scope

Rhode Island College is a state entity, and therefore workers are not subject to the federal OSHA regulations. However, RIC is covered by state laws and regulations. The Rhode Island Right-to-Know Act does cover state employees, and this program is designed to cover both federal and state regulations, as there is much overlap in these regulations. Additionally, it is a best management practice for the College.

Under requirements of these standards, all chemicals that are produced, imported, or are otherwise used at Rhode Island College are reviewed, and information relative to the hazards of these chemicals is communicated to all affected employees. Since RIC does not produce or import chemicals, requirements of the HazCom standard for those specific industries do not apply.

Employees engaged in the handling of hazardous chemicals have the right to know of, and to be informed as to the chemical and physical hazards that are inherent to their job duties. They also have the right to be informed of the proper methods for protecting themselves from these hazards. Employees with questions concerning the use of the RTK Program, or questions concerning the information contained within it, may contact the Right-to-Know Coordinator (RTKC).

This written Hazard Communication Program will be reviewed by the Right-to-Know Coordinator or their designee annually at a minimum. This written Program will be kept on file in the Office of the Physical Plant and made available, upon request, to employees, designated representatives, and OSHA officials.

### 2.1 Employee Rights

Employees reserve the right to refuse work if information has not provided within the designated timeframes outlined in this program. Any employee exercising their rights as it relates to the RTK Act may not be disciplined or discriminated against, nor can any waivers of these rights be requested or issued.

## 2.2 Materials Not Covered

The Hazard Communication Standard and this written Program do not apply to the following materials if they meet the specified criteria:

- Hazardous waste(s) as defined by Solid Waste Disposal Act and the Resource Conservation and Recovery Act (RCRA) when subject to regulations issued under that Act by the Environmental Protection Agency (EPA);
- Any hazardous substance defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) when the hazardous substance is the focus of remedial or removal action begin conducted in accordance with EPA regulations;
- Tobacco or tobacco products;
- Wood or wood products, including lumber which will not be processed;
- Any drug, as defined by the Federal Food, Drug, and Cosmetic Act when it is in solid, final form for direct administration to the patient, or drugs which are packaged by the chemical manufacturer for sale to consumers in a retail establishment, and drugs intended for personal consumption by employees while in the workplace;
- Articles ("Article") means a manufactured item, other than a fluid or particle which:
  - Is formed to a specific shape or design during manufacture;
  - Has end use function(s) dependent in whole or in part upon its shape or design during end use; and
  - Under normal conditions of use does not release more than very small quantities of a hazardous chemical and does not pose a physical hazard or health risk to employees.;
- Food or alcoholic beverages which are sold, used, or prepared in a retail establishment intended for personal consumption by employees while in the workplace;
- Cosmetics packaged for sale to consumers in a retail establishment and those intended for personal consumption by employees while in the workplace;
- Any consumer product or hazardous substance, where it is used in the workplace for the purpose intended by the manufacturer and the use results in a duration and frequency of exposure which is not greater than the range of exposures that could reasonably be experienced by consumers when used for the purpose intended;
- Nuisance particulates where the chemical manufacturer or importer can establish that they do not pose any physical or health hazard;
- Ionizing and non-ionizing radiation; and,
- Biological hazards.

## 2.3 Laboratory Setting

The Hazard Communication Standard and RI RTK Law only apply to laboratories that produce commercial quantities of materials and those connected to production processes. Laboratories where the use of hazardous chemicals is relatively small and used on a non-production basis, such as research and educational laboratories at Rhode Island College, are covered under the OSHA Laboratory Standard (29 CFR 1910.1450). Information regarding laboratories will be covered in **Rhode Island College's Chemical Hygiene Plan**.

### 3.0 Definitions

The following definitions are taken from RIGL Chapter 28-21-2 and 29 CFR 1910.1200(c).

**Article** - A manufactured item other than a fluid or particle:

- Which is formed to a specific shape or design during manufacture;
- Which has end use function(s) dependent in whole or in part upon its shape or design during end use; and
- Which under normal conditions of use does not release more than very small quantities, *e.g.*, minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

**Chemical** - Any substance, or mixture of substances.

**Chemical manufacturer** - An employer with a workplace where chemical(s) are produced for use or distribution.

**Chemical name** - Scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) rules of nomenclature, or a name that will clearly identify the chemical for the purpose of conducting a hazard classification.

**Classification** - To identify the relevant data regarding the hazards of a chemical; review those data to ascertain the hazards associated with the chemical; and decide whether the chemical will be classified as hazardous according to the definition of hazardous chemical in this program. In addition, classification for health and physical hazards includes the determination of the degree of hazard, where appropriate, by comparing the data with the criteria for health and physical hazards.

**Common name** - Any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name.

**Container** - Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. For purposes of this program, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.

**Designated representative** - Any individual or organization to whom an employee gives written authorization to exercise such employee's rights under this program. A recognized or certified collective bargaining agent shall be treated automatically as a designated representative without regard to written employee authorization.

**Designated substance** – Any substance contained within the list of toxic or hazardous substances covered by this chapter provided they are in quantities exceeding two (2) gallons or ten (10) pounds of the substance within the workplace, except in the case of carcinogens, mutagen, or teratogen which shall be reported if the concentration is equal to or greater than one part of the substance per ten thousand (10,000) by volume, and provided further that nothing contained in this definition precludes the director of labor and training from establishing more stringent standards pursuant to rules and regulations in conformity with the Administrative Procedures Act, chapter 35 of title 42.

**Distributor** - A business, other than a chemical manufacturer or importer, which supplies hazardous chemicals to other distributors or to employers.

**Employee** - A worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered.

**Employer** - A person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.

**Exposure or exposed** - When an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential ( *e.g.* accidental or possible) exposure. "Subjected" in terms of health hazards includes any route of entry ( *e.g.* inhalation, ingestion, skin contact or absorption.)

**Foreseeable emergency** - Any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace.

**Hazard category** - The division of criteria within each hazard class, *e.g.*, oral acute toxicity and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.

**Hazard class** - The nature of the physical or health hazards, *e.g.*, flammable solid, carcinogen, oral acute toxicity.

**Hazard not otherwise classified (HNOC)** - An adverse physical or health effect identified through evaluation of scientific evidence during the classification process that does not meet the specified criteria for the physical and health hazard classes addressed in this Program. This does not extend coverage to adverse physical and health effects for which there is a hazard class addressed in this Program, but the effect either falls below the cut-off value/concentration limit of the hazard class or is under a GHS hazard category that has not been adopted by OSHA (*e.g.*, acute toxicity Category 5).

**Hazard statement** - A statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.

**Hazardous chemical** - Any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

**Health hazard** - A chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard. The criteria for determining whether a chemical is classified as a health hazard are detailed in Appendix A to 1910.1200 Health Hazard Criteria.

**Immediate use** – Means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

**Importer** - The first business with employees within the Customs Territory of the United States which receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or employers within the United States.

**Label** - An appropriate group of written, printed or graphic information elements concerning a hazardous chemical that is affixed to, printed on, or attached to the immediate container of a hazardous chemical, or to the outside packaging.

**Label elements** - The specified pictogram, hazard statement, signal word and precautionary statement for each hazard class and category.

**Mixture** - A combination or a solution composed of two or more substances in which they do not react.

**Physical hazard** - A chemical that is classified as posing one of the following hazardous effects: explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid or gas); self-reactive; pyrophoric (liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; or in contact with water emits flammable gas. See Appendix B to 1910.1200 Physical Hazard Criteria.

**Pictogram** - A composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.

**Precautionary statement** - A phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.

**Produce** - To manufacture, process, formulate, blend, extract, generate, emit, or repackage.

**Product identifier** - The name or number used for a hazardous chemical on a label or in the SDS. It provides a unique means by which the user can identify the chemical. The product identifier used shall permit cross-references to be made among the list of hazardous chemicals required in the written hazard communication program, the label and the SDS.

**Pyrophoric gas** - A chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130 degrees F (54.4 degrees C) or below.

**Responsible party** - Someone who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

**Safety data sheet (SDS)** - Written or printed material concerning a hazardous chemical that is prepared in accordance with **Section 6.0**.



**Signal word** - A word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used in this program are "danger" and "warning." "Danger" is used for the more severe hazards, while "warning" is used for the less severe.

**Simple asphyxiant** - A substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death.

**Specific chemical identity** - The chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.

**Substance** - Chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

**Trade secret** - Any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Appendix E to 1910.1200 Definition of Trade Secret, sets out the criteria to be used in evaluating trade secrets.

**Use** - To package, handle, react, emit, extract, generate as a byproduct, or transfer.

**Work area** - A room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.

**Workplace** - An establishment, job site, or project, at one geographical location containing one or more work areas.

## 4.0 Responsibilities

As an employer in Rhode Island, Rhode Island College is responsible for providing information about hazardous chemicals in the workplace to all employees. This is accomplished by this written Program, labels and other forms of warning, safety data sheets, and information and training.

### 4.1 Right-to-Know Coordinator or Designee

- Coordinates and administers the RTK Program for the College;
- Acts as primary point of contact for employees with questions related to hazard communication;
- Maintains hazardous materials inventory and reviews annually;
- Acquires and maintains required SDS;
- Develops and coordinates training;
- Maintains records of general and department-specific employee training;
- Conducts employee chemical exposure monitoring, where appropriate;
- Provides appropriate personal protective equipment;
- Provides contractors with necessary information, upon request;
- Obtains information from contractors regarding chemicals they will use in work areas in coordination with the applicable department managers;

- Reviews written THE RTK Program at least annually.

The Right-to-Know Coordinator at Rhode Island College will be the Associate Director of Facilities and Operations.

#### 4.2 Department Supervisor

- Informs RTK Coordinator (or designee) of new chemical purchases, to aid in maintenance of chemical inventory;
- Provides SDSs received to RTK Coordinator (or designee);
- Ensures containers are properly labeled;
- Ensures employees attend required general training provided by the RTK Coordinator (or designee);
- Provides chemical and area-specific training to employees;
- Ensures employees receive necessary specialized training for non-routine tasks.

#### 4.3 Employees

- Follow all parts of the RTK Program;
- Attend Hazard Communication training;
- Does not deface container labels;
- Labels new containers not meeting the definition of process containers appropriately;
- Reviews container labels and SDSs for products before using them;
- Uses personal protective equipment appropriately;
- Works with hazardous chemicals in a safe manner, following guidelines outlined in training.

#### 4.4 Shipping & Receiving

- Ensure labels are not removed or defaced on all received containers;
- Distribute SDSs received with shipments to appropriate departments;
- Participate in Department of Transportation (DOT) training as appropriate.

An Emergency Contact List for the College can be found in **Appendix A**.

## 5.0 Hazardous Materials

### 5.1 Chemical Identification Lists

Each department within the College will develop, maintain and update, as appropriate, a list or inventory of chemical substances for use by department employees. The department's chemical inventory lists each material maintained by the department in alphabetical order, as identified on the current Safety Data Sheets and container label. For mixtures, the list must contain chemical or trade names of any designated substances greater than 1% with a volume of two (2) gallons or ten (10) pounds (lbs). For carcinogens, mutagens, or teratogens, chemicals must be reported with a concentrations of 0.01% or more.

These inventories are reviewed at least annually by the RTK Coordinator or their designee. These lists must be updated prior to introduction of any new substance into the workplace. This inventory is available to all employees during all hours of operation and is located in the Office of the Physical Plant. If requested, chemical lists must be made available within three (3) working days of the initial request. This does not include weekends or holidays.

A sample inventory form/chemical list is available in **Appendix B** and may be used for reference.

## 5.2 Categories of Hazardous Chemicals

The RTKC and Department Supervisors shall ensure that all employees are aware of the locations, hazards, and appropriate control measures for work involving hazardous chemicals. In some cases, specific procedures may be required for working with highly hazardous materials. Review the SDS for specific handling and storage requirements of hazardous chemicals. Some specific hazards that may be present in various work areas at the Rhode Island College are listed below.

### 5.2.1 Allergens and Sensitizers

A chemical allergy is an adverse reaction by the immune system to a chemical. Allergic reactions result from previous sensitization to a chemical or a structurally similar chemical. Once sensitization occurs, allergic reactions can result from exposure to extremely low doses of the chemical. Allergic reactions can be immediate, occurring a few minutes after an exposure. Anaphylactic shock is a severe immediate allergic reaction that can result in death if not treated quickly. Allergic reactions can also be delayed, taking hours or even days to develop. It is important to recognize that a delayed chemical allergy can occur after the chemical has been removed. Examples of substances that may cause allergic reactions include formaldehyde, various isocyanates, and certain phenol derivatives.

### 5.2.2 Asphyxiants

Asphyxiants are substances that interfere with the transport of an adequate supply of oxygen to the vital organs of the body. Simple asphyxiants are substances that displace oxygen from the air being breathed to such an extent that adverse effects result. Acetylene, carbon dioxide, argon, helium, ethane, nitrogen, and methane are common asphyxiants. It is important to recognize that even chemically inert and biologically benign substances can be extremely dangerous under certain circumstances such as carbon monoxide.

### 5.2.3 Compressed Gases

Gas cylinders contain either compressed liquids or gases. Gas cylinders represent serious physical hazards despite their contents as puncture, heat, faulty valves, pressure or regulators may result in a rapid release of the entire contents. The following safety considerations should be implemented where applicable:

- The cylinder contents must be clearly identifiable.
- Handle cylinders carefully and do not roll, slide, or drop. Use a cart or hand truck to transport.
- Do not lift a cylinder by its cap.
- Secure all cylinders while in storage, transport, or use.
- Never tamper with cylinder valves, force connections, or use homemade adapters. Use only approved equipment. Never repair or alter cylinders, valves, or safety relief devices.
- Only use a regulator compatible with the cylinder contents.
- Close the cylinder valve when not in use.
- When empty, turn off the cylinder valve and label the cylinder as empty. Store separately from full cylinders.
- Store cylinders in a well-ventilated area away from ignition sources, heat, flames, and flammable chemicals.
- Check for gas leaks using soapy water around the connections.

- Do not store flammable gas cylinders with oxidizers such as nitrous oxide or oxygen. They must be separated by a minimum of 20 ft. or a 5-foot fire wall.

#### **5.2.4 Controlled Substances**

The use of controlled substances is subject to U.S. Drug Enforcement Administration (DEA) regulation. A controlled substance is a drug or other substance, or immediate precursor, regulated by the DEA under schedules I-V. Examples include barbitol and chloral hydrate.

#### **5.2.5 Corrosive Chemicals**

The Resource Conservation and Recovery Act (RCRA) defines a corrosive chemical as a liquid with a pH  $\leq 2$  or  $> 12.5$ . Corrosive chemicals can cause severe tissue damage depending on the corrosivity of the chemical. The primary means of protection from corrosive chemicals is the use of gloves, goggles, face shields, aprons, lab coats, and other chemical resistant clothing. Exercise extreme caution when handling corrosive chemicals. The following safety considerations should be implemented where applicable:

- Transport corrosives in a bottle carrier or cart.
  - Do not handle by the neck alone; support the weight of the bottle from the bottom when handling or pouring.
- Do not store corrosives with flammable liquids or oxidizing chemicals.
- Isolate corrosive chemicals from incompatible chemicals.
- Reference the chemical's SDS for proper handling, PPE, and storage requirements.
- If a corrosive chemical comes in contact with your skin, eyes, or clothing, thoroughly wash the affected areas utilizing the safety showers or eyewash units.

#### **5.2.6 Cryogenic Liquids**

Cryogenic liquids are liquefied gases that are kept in their liquid state at very low temperatures and are associated with various hazards including: extreme cold, asphyxiation, explosion, cold contact burns, and toxicity. Employees should be thoroughly trained on the hazards and the proper steps to avoid them. Training should include emergency procedures, operation of equipment, safety devices, appropriate engineering controls, knowledge of the properties of the materials used, and personal protective equipment required. Insulated gloves should always be worn when handling anything that comes into contact with cryogenic liquids or the vapors. Considerations must be made to prevent cryogenic material from contacting skin. Clothing such as a lab coat, gloves, pants, closed toed shoes, safety glasses, goggles, and face shields should be worn.

#### **5.2.7 Flammable and Combustible Chemicals**

OSHA defines flammable chemicals as liquids with a flashpoint below 199.4°F (93°C) and solid materials that readily sustain combustion. Flammable liquids are divided into four categories:

**Category 1** - Flash point below 73.4°F (23°C) and boiling points at or below 95°F (35°C)

**Category 2** - Flash point below 73.4°F (23°C) and boiling points above 95°F (35°C).

**Category 3** - Flash point at or above 73.4°F (23°C) and at or below 140°F (60°C).

When Category 3 liquids with flash points at or above 100°F (37.8°C) are heated for use to within 30°F (16.7°C) of their flash point, they must be handled in accordance with the requirements for a Category 3 liquid with a flashpoint below 100°F (37.8°C).

**Category 4** - Flash point above 140°F (60°C) and at or below 199.4°F (93°C).

When Category 4 flammable liquids are heated for use to within 30°F (16.7°C) of their flash points, they must be handled in accordance with the requirements for a Category 3 liquid with a flashpoint at or above 100°F (37.8°C).

In addition, the new rules specify that when a liquid with a flash point greater than 199.4°F (93°C) is heated for use to within 30°F (16.7°C) of its flash point, it must be handled in accordance with the requirements for a Category 4 flammable liquid.

The following safety considerations should be implemented where applicable:

- Do not allow smoking or other sources of open flames in areas where flammable chemicals are used.
- Know the location fire extinguishers, fire alarms, and emergency exits in the work area.
- Do not store flammable liquids in domestic-type refrigerators. Use only refrigerators rated for flammables.
- Do not store flammables with oxidizing agents (e.g., nitric, perchloric, and sulfuric acids).
- Do not expose flammable liquids to potential sources of ignition such as electrical equipment, heat, burners, or open flames.
- To prevent accidental electrical charge, the use of bonding and grounding equipment should be used whenever applicable. The use of non-sparking tools can prevent an ignition source.
- Store flammable liquids in an approved fire rated flammable storage cabinet.
- Do not store flammable liquids on the floor, unless protected by secondary containment.
- Minimize the amount flammable liquids that are in use, being stored, and that are generated as wastes.
- Storage of flammable liquids greater than 10 gallons within a work area must be in an approved and labeled flammable storage cabinet.
- The MSDS must be reviewed for additional safety requirements and precautions.

### **5.2.8 Hepatotoxins**

Chemicals that are toxic to the liver are called hepatotoxins. The effects of hepatotoxins depend on the amount, point of entry and distribution speed of the toxin, and on the health of the person. Signs and symptoms include jaundice and liver enlargement. Carbon tetrachloride is examples of a hepatotoxin. Hepatotoxins should be stored in a tightly closed container in a cool, dry, well-ventilated area away from incompatible substances. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits such as a chemical fume hood.

### **5.2.9 Irritants**

An irritant is a chemical, which is not corrosive, but causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. A wide variety of organic and inorganic chemicals are irritants; thus, skin contact with all chemicals should be avoided. Use a properly functioning chemical fume hood when handling irritants that can be inhaled. At minimum, safety glasses, lab coat, long pants, gloves, and closed toed shoes should be worn.

**5.2.10 Nephrotoxins**

Nephrotoxins are chemicals that inhibit, damage or destroy the cells and or tissues of the kidneys. Signs and symptoms include edema and proteinuria. Examples of nephrotoxins include halogenated hydrocarbons, heavy metals, and uranium. Both acute and chronic exposure to certain organic chemicals can cause inflammation, injury or severe damage to the kidneys. Use proper engineering controls such as a fume hood to minimize exposure.

**5.2.11 Neurotoxins**

Neurotoxic chemicals can induce an adverse effect on the structure or function of the central and/or peripheral nervous system, which can be permanent or reversible. Neurotoxic chemicals may cause narcosis, slurred speech, decrease in motor functions, and staggered gait. Many neurotoxins are chronically toxic substances whose adverse effects are not immediately apparent. Examples include mercury and carbon disulfide.

**5.2.12 Organic Peroxides**

Organic peroxides are hazardous because of their extreme sensitivity to shock, sparks, heat, light, strong oxidizing and reducing agents, and other forms of detonation. Organic peroxides may cause fire, create explosion hazards, and may be toxic or corrosive. Some organic peroxides are dangerously reactive, decomposing very rapidly or explosively if they are exposed to slight heat, friction, mechanical shock or contamination with incompatible materials. Precautions for handling peroxides should include the following:

- Limit the quantity of peroxides.
- Do not return unused peroxides to the container.
- Clean up all spills immediately. Solutions of peroxides can be absorbed using vermiculite or other absorbing material.
- Do not permit smoking, open flames, and other sources of heat near peroxides. Areas should be labeled that contain peroxides so that this hazard is evident.
- Avoid friction, grinding, and other forms of impact near peroxides, especially solid peroxides. Glass containers that have screw-cap lids or glass stoppers should not be used. Polyethylene bottles that have screw-cap lids may be used.
- Isolate from incompatible materials such as strong acids and bases, flammable and combustible liquids, and reducing agents.

**5.2.13 Oxidizers**

Oxidizers are chemicals other than a blasting agent or explosive as defined in § 1910.109(a), that initiate or promote combustion in other materials, causing fire either of itself or through the release of oxygen or other gases. Examples include perchloric acid, potassium persulfate, and lead nitrate. Precautions for handling oxidizers should include the following:

- Minimize the amount of oxidizers used and stored.
- Isolate from incompatible chemicals (e.g., organics, flammable, dehydrating, or reducing agents).
- Do not store oxidizers in wooden cabinets or on wooden shelves.
- Do not return unused material to the original container.
- Store in a tightly closed container and in a cool, dry, ventilated area.

**5.2.14 Pyrophoric Chemicals**

Pyrophoric chemicals are extremely reactive toward oxygen and water and must never be exposed to the atmosphere. Examples include sodium hydride and magnesium. Exposure of these chemicals to the air could result in spontaneous combustion, which could cause serious burns or other injuries to the person handling the chemical or others in the immediate area. In addition, all combustible materials, including paper products, should not be allowed to come in contact with any pyrophorics at any time. Pyrophorics can be handled and stored safely as long as all exposure to atmospheric oxygen and moisture is avoided. Solids must be transferred under an inert atmosphere in an efficient glove box. Glass bottles of pyrophorics should not be handled or stored unprotected. The metal container shipped with each bottle should be retained as a protective container for each bottle for transporting and storage.

**5.2.15 Reproductive Toxins**

Reproductive toxins are chemicals which affect the reproductive capabilities including chromosomal damage and effects on fetuses. Reproductive toxins have adverse effects on various aspects of reproduction, including fertility, gestation, lactation, and general reproductive performance. Reproductive toxins can affect both men and women. Reproductive toxins include lead, carbon disulfide, and mercury.

**5.2.16 Select Carcinogens**

A carcinogen is a substance capable of causing cancer. Carcinogens are particularly insidious toxins because they may have no immediate apparent harmful effects. Carcinogens should be handled using prudent practices. A chemical is considered to be a carcinogen if:

- It has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen; or
- It is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or,
- It is regulated by OSHA as a carcinogen.

**5.2.17 Toxic Chemicals**

Toxic is defined by OSHA 29 CFR 1910.1200 as a chemical which falls in any of these three categories:

- A chemical that has a median lethal dose (LD50) of more than 50 milligrams per kilogram but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
- A chemical that has a median lethal dose (LD50) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.
- A chemical that has a median lethal concentration (LC50) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than two milligrams per liter but not more than 20 milligrams per liter of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

### **5.2.18 Water-Reactive Chemicals**

Water-reactive chemicals are likely to become spontaneously flammable or give off flammable or toxic gas when in contact with water. Examples include aluminum powder, barium, calcium hydride, and sodium borohydride. Protect from moisture and separate from incompatibles. Store these chemicals in accordance with manufacturer or applicable MSDS requirements.

#### **5.2.18.1 Unknown Chemicals**

Unknown chemicals or those for which complete physical and chemical hazards are not known, must be assumed to be hazardous. Appropriate PPE and engineering controls should be utilized.

## **6.0 Safety Data Sheets (SDS)**

The College maintains and updates Safety Data Sheets (SDS) in various forms (i.e. hard copy, electronic) for all designated substances. The RTK Coordinator or their designee is responsible for maintaining and updating the SDS file(s). If an SDS is not on file, the Right-to-Know Coordinator or their designee will request the SDS from the manufacturer, importer, or distributor of the product. These requests should be documented. These requests must be documented and maintained in the office of the RTKC. Within 45 days of the original request, the SDS has not been obtained, the RTKC will advise the RI DLT of the failure.

The RTKC relies on the initial hazard evaluation performed by the manufacturer, importer, or distributor of the product. The SDSs, maintained by the Physical Plant, shall comply with 29 CFR 1910.1200(g).

SDS for the labs may be kept on file in the applicable departments.

See **Appendix C** for additional information on reviewing and understanding SDSs.

### **6.1 Requirements**

Safety Data Sheets must be readily available for all employees. Employees should not work with any hazardous chemicals without access to and review of the SDS. Copies of the SDS must be retained for 30 years. Each SDS must be in English and contain the following information:

1. Identification of Substance/Mixture
2. Hazard Identification
3. Composition
4. First Aid Measures
5. Firefighting Measures
6. Accidental Release Measures
7. Handling and Storage
8. Exposure Controls/Personal Protection
9. Physical and Chemical Properties
10. Stability and Reactivity
11. Toxicological Information
12. Ecological Information
13. Disposal Considerations
14. Transport Information
15. Regulatory Information
16. Other Information



If no information or data is available for any given section on an SDS, this must be noted on the SDS. More information on the contents of each of the 16 sections listed above can be found in **Appendix B**.

## 6.2 Trade Secrets

Chemical manufacturers or importers may withhold specific chemical names/identities, percentages/concentration, or other information regarding a hazardous chemical if it is a trade secret. The manufacturer or importer must be able to support this claim and note it is being withheld as a trade secret. The SDS must include properties or effects of the chemical. Trade secret information may be made available, upon request, in certain situations as outlined in 29 CFR 1910.1200(i).

## 6.3 Obsolete Materials

SDS for products that are no longer used by the College will be kept and archived for the required 30-year period.

## 6.4 Internet Access to SDS

The Office of the Physical Plant will maintain a central file of SDS, not including materials used in the laboratories not covered by this standard. However, as an additional resource, employees can find SDSs for many products through the Internet.

# 7.0 Labeling

## 7.1 Labels on Shipped Containers

Chemical manufacturers, importers, or distributors are responsible for ensuring that each container of hazardous chemicals is appropriately labeled, tagged, or marked in accordance with the Hazard Communication Standard Globally Harmonized System (GHS). Incoming chemicals and materials to the College should meet the below labeling requirements if not already identified as an exception as outlined in **Section 2.2 or 7.7** of this Program. These labeling requirements are intended to provide users with information concerning the potential hazards of the chemicals being used and providing information needed to permit an employee to locate the corresponding SDS. The 2012 labeling revisions require containers to be labeled, tagged, or otherwise marked with the following information:

1. Product Identifier;
2. Signal Word;
3. Hazard Statement(s);
4. Pictogram(s);
5. Precautionary Statement(s);
6. Name, address and telephone number of manufacturer(s), importer, or other responsible party.

**NOTE:** Although full compliance with the 2012 labeling requirements was not required until June 2015, it is likely that chemicals purchased prior to 2015 will be labeled in accordance with the revised standard and will differ from those previously purchased, as manufacturers and distributors begin revising them accordingly. See **Appendix D** for definitions of the labeling terms above and the pictograms associated with each hazard classification under the 2012 Hazard Communication standard revisions.

If an incoming chemical does not meet the definitions of an exemption or the labeling requirements above, the following labeling is required per the RI RTK Act:

- Identity of the designated substance; and
- Hazard warnings.

## 7.2 Workplace Labeling

Labels on all workplace containers will include a product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and the name and address of the manufacturer or other responsible party who can provide additional information on the designated substance and appropriate emergency procedures, if necessary. When stationary containers in a work area have similar contents and hazards, the employer may post signs or placards to convey the required information rather than affixing labels to each individual container.

## 7.3 Portable Containers

Containers intended only for the immediate use (within the work shift) of an employee performing a transfer from a labeled container do not require labeling. If the product will be used for more than one work shift or will leave the control of the employee performing the transfer, the secondary container must be labeled in accordance with **Section 7.2**.

## 7.4 Label Maintenance

No one shall intentionally deface or obscure container labels or hazard warnings on incoming containers of hazardous materials. Supervisors of employees using hazardous materials are responsible for ensuring that labels are legible on all containers in their work area.

## 7.5 Stationary Vessels

Stationary vessels containing hazardous materials must also be labeled. Signs, placards, operating procedures, or other written materials may be used in lieu of affixing labels or signs to stationary process containers. This is permitted so long as the alternative method identifies the containers to which it is applicable and conveys the information described in **Section 7.2**, above, on a label. The written materials must be readily accessible to the employees in their work area throughout each work shift.

## 7.6 Piping Containing Hazardous Materials

If any pipes containing chemicals are unlabeled, employees may request information regarding the hazardous materials contained within before starting or performing any work on the unlabeled pipes. These requests can be directed to department supervisors, or the Right-to-Know Coordinator, and may include:

- Hazardous materials contained in the pipe(s);
- Potential hazards;
- SDS for materials;
- Any applicable safety precautions; and
- Any additional information or necessary training.

## 7.7 Exemptions

The following materials are not subject to the labeling requirements of the Hazard Communication Standard if they meet the criteria listed below:

- Any pesticide subject to the labeling requirements of the Federal Insecticide, Fungicide, and Rodenticide Act issued by the Environmental Protection Agency (EPA);
- Any chemical substance or mixture subject to the labeling requirements of the Toxic Substances Control Act (TSCA) issued by the EPA;
- Any food, food additive, color additive, drug, cosmetic, or medical or veterinary device or product, including materials intended for use as ingredients in such products that are subject to the labeling requirements of the Federal Food, Drug, and Cosmetic Act, or the Virus-Serum-Toxin Act, issued by the Food and Drug Administration (FDA) or the Department of Agriculture;
- Alcoholic beverages, including wine and malt beverages, not intended for industrial use, subject to labeling requirements of the Federal Alcohol Administration Act issued by the Bureau of Alcohol, Tobacco, Firearms and Explosives;
- Consumer products or hazardous substances subject to labeling requirements or a consumer product safety standard of the Consumer Product Safety Act or Federal Hazardous Substances Act issued by the Consumer Product Safety Commission; and
- Vegetable or other agricultural seeds treated with pesticides subject to the labeling requirements of the Federal Seed Act issued by the Department of Agriculture.

## 8.0 Training

All employees potentially exposed to hazardous materials in the College must be provided with training prior to initial assignment. Supervisors are responsible for determining individuals who require training in their department and maintaining attendance records for both general and any applicable department-specific training.

### 8.1 Employee Information and Training

Prior to exposure or use of hazardous materials, all new employees covered by this standard will be trained to the contents of this program. This training should occur upon initial assignment and at least annually. Additionally, retraining is required whenever new chemical hazards are introduced into the work area. Supervisors may seek assistance from the RTKC, or their designee, to facilitate this training.

Information and training provided, as outlined in **Appendix E**, will include:

- The RTK Act employee information and training requirements;
- Any operations in work areas where hazardous chemicals are present;
- The location and availability of the RTK Program, including the lists/inventories of hazardous chemicals and Safety Data Sheets;
- Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area;
- The physical, health, simple asphyxiation, combustible dust and pyrophoric gas hazards, as well as hazards not otherwise classified, as applicable, of the chemicals in the work area;
- The measures employees can take to protect themselves from these hazards, including specific procedures implemented to protect workers from exposure such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and
- The details of the RTK Program developed by the employer, including an explanation of the labels received on shipped containers and the workplace labeling system used by their employer; the safety data sheet, including the order of information and how employees can obtain and use the appropriate hazard information.

**NOTE:** Additional training on hazardous chemicals must occur whenever a new hazard is introduced into the work area or upon worker transfer to a new area, as necessary.

## 9.0 Contractor Requirements

### 9.1 Rhode Island College Responsibilities

If a contractor is likely to encounter a hazardous chemical during the course of their work at Rhode Island College, the RTKC, or their designee, will provide to the contractor a copy of the RTK Program, the chemical inventory and the opportunity to review SDS on file for hazardous chemicals used or stored.

### 9.2 Departmental Responsibility

Each Department within the College is responsible for determining if a contractor will encounter hazardous chemicals during the course of their work at the college. If they will, the Department must contact the RTKC who will provide the contractor with the following information:

- Safety data sheets for each hazardous chemical the other employer(s)' employees may be exposed to while working;
- Precautionary measures to protect employees during normal operating conditions and in foreseeable emergencies; and
- The labeling system used in the workplace

### 9.3 Contractor's Responsibility

The contractor is expected to inform and provide the RTKC or Department Supervisor a chemical inventory and SDS' for the materials that they will bring to the college or use in the work area during the course of their work at Rhode Island College. The contractor must also provide information on the location of chemical use and storage to the EHS department. The contractor is responsible for the removal of all unused portions of the chemicals and their waste products from the college.

## 10.0 Non-Routine Tasks

Special hazards which employees may encounter when performing non-routine duties in the course of their work must be discussed with the employee before the job begins. It is the Supervisor's responsibility to ensure that employees receive the necessary specialized training. Information that must be provided includes safe handling, personal protective equipment, appropriate exposure monitoring, and other appropriate control measures.

Assistance in evaluating the hazards of non-routine tasks and determining the appropriate precautions and protective measures is available through the Physical Plant.

Non-routine tasks may include but are not limited to the following: working on, near, or with unlabeled piping, unlabeled containers of an unknown substance, confined space entry where a hazardous substance may be present and/or a one-time task using a hazardous substance differently than intended (example: using a solvent to remove stains from tile floors), etc.

### 10.1 Non-Routine Evaluation Process

The Department Supervisor will evaluate all non-routine tasks before the task commences, to determine all hazards present. This determination will be conducted with quantitative/qualitative analysis (air sampling, substance identification/analysis, etc., as applicable).

- Step 1: Evaluate the hazard(s)
- Step 2: Identify and Develop Appropriate Precautions
- Step 3: Develop Specific Training & Documentation
- Step 4: Conduct Training
- Step 5: Confirm understanding of training, respond to questions and ensure employee is prepared to safely perform task.
- Step 5: Perform Task
- Step 6: Review Operation (Make appropriate changes to Non-Routine Task Evaluation and Execution process to ensure continuous improvement.)
- Step 7: Document Process

## 11.0 Rhode Island Right-to-Know Law

### 11.1 Annual Registration

The Rhode Island Right-to-Know Law requires that employers must register a list of hazardous substances annually with the Rhode Island Department of Labor and Training (RI DLT). Any hazardous stored onsite over 2 gallons, 10 pounds, or contains at least 1% of a carcinogen must have an SDS on file. In addition to the chemical list, documentation detailing the training program must be submitted to the RI DLT.

A copy of the list submitted to the RI DLT should also be submitted to local fire departments accompanied by a diagram of hazardous substance locations of use and/or storage. Additional information, including SDS, may be made available to local fire departments, upon request.

The registration forms are mailed out annually by the RI DLT but can also be found on their website: [RTKAnnRegistration\(ri.gov\)](http://RTKAnnRegistration(ri.gov))

### 11.2 Right-to-Know Posters

In addition to the annual registration, posters provided by the RI DLT must be posted in conspicuous area(s) for employees. Required posters can be printed out from the RI DLT website:

[Required Posters For the Workplace- Rhode Island -Department of Labor and Training \(ri.gov\)](#)  
[Rhode Island Right-to-Know Poster](#)

Employers may also request posters be sent from the Department.

## 12.0 Recordkeeping

### 12.1 Safety Data Sheets

As noted in **Section 6.0**, all Safety Data Sheets will be kept on file in various formats at RIC. These will be kept on file for a minimum of 30 years. SDS must be made available upon request to designated representatives and OSHA officials. Upon request, the SDS must be made available within fifteen (15) working days, or any reasons for delay and earliest availability date(s).

## 12.2 Inventory

As noted in **Section 5.1**, hazardous material inventories will be kept on file in the Office of the Physical Plant. These may be kept on file for 30 years to ensure compliance with OSHA's Access to Employee Exposure Medical Records (29 CFR 1910.1020).

## Appendix A: Emergency Contact List

Title	Name	Contact Info
Interim Director of Facilities and Operations	Greg Gammell	(401) 456-9788 ggammell@ric.edu
Associate Director of Facilities and Operations <i>Right-to-Know Coordinator (RTKC)</i>		(401) 456-8537
<b>Campus Police</b> Director of Security and Safety/Chief of Campus Police	Col. James Mendonca	(401) 456-8888 jmendonca@ric.edu
<b>Health Services</b> Director of Health Services	Dr. Marie Wilks	(401) 456-8055 mwilks@ric.edu
Facilities and Operations Administrative Assistant	Julie Teixeira	(401) 456-8262 jteixeira@ric.edu



**Appendix B: Hazardous Materials Inventory Form**

Department:

Date:

<b>CAS #</b>	<b>Product Number</b>	<b>Product Name</b>	<b>Manufacturer</b>	<b>Storage Location</b>



## Appendix C: Reading and Understanding Safety Data Sheets

Please note that revisions to the Hazard Communication Standard promulgated in March 2012 require manufacturers/importers to use a standardized format and minimum information required on all SDSs by no later than December 1, 2015. SDSs from before this date may not be in the proper format.

The 16-section standardized SDS includes the following information which may be found in a different order and format in current SDSs as noted above.

### 1. Identification

- (a) Product identifier used on the label;
- (b) Other means of identification;
- (c) Recommended use of the chemical and restrictions on use;
- (d) Name, address, and telephone number of the manufacturer, importer, or other responsible party;
- (e) Emergency phone number.

### 2. Hazard(s) Identification

- (a) Classification of the chemical in accordance with paragraph (d) of 1910.1200;
- (b) Signal word, hazard statement(s), symbol(s), and precautionary statement(s). Hazard symbols may be provided as graphical reproductions in black and white or the name of the symbol.; e.g., flame, skull and crossbones, etc.
- (c) Describe any hazards not otherwise classified;
- (d) Where an ingredient with unknown acute toxicity is used in a mixture at a concentration  $\geq 1\%$  and the mixture is not classified based on testing of the mixture as a whole, a statement that X% of the mixture consists of ingredient(s) of unknown acute toxicity.

### 3. Composition/information on ingredients

Except as provided for in 1910.1200 on trade secrets:

#### **For Substances**

- (a) Chemical name;
- (b) Common name and synonyms;
- (c) CAS number and other unique identifiers;
- (d) Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance.

#### **For Mixtures**

In addition to the information required for substances:

- (a) The chemical name and concentration (exact percentage) or concentrations of all ingredients Which are classified as health hazards in accordance with paragraph (d) of 1910.1200 and
  - (1) are present above their cut-off/concentration limits; or
  - (2) present a health risk below the cut-off/concentration limits.
- (b) The concentration (exact percentage) shall be specified unless a trade secret claim is made, when there is batch-to-batch variability in the production of the mixture, or for a group of substantially similar mixtures with similar chemical composition.

4. **First Aid Measures**

- (a) Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion;
- (b) Most important symptoms/effects, acute and delayed;
- (c) Indication of immediate medical attention and special treatment needed, if necessary.

5. **Fire-Fighting Measures**

- (a) Suitable (and unsuitable) extinguishing media;
- (b) Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products).

6. **Accidental Release Measures**

- (a) Personal precautions, protective equipment, and emergency procedures;
- (b) Methods and materials for containment and cleaning up.

7. **Handling and Storage**

- (a) Precautions for safe handling.

8. **Exposure controls/ Personal Protection**

- (a) OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available;
- (b) Appropriate engineering controls.

9. **Physical and Chemical Properties**

- (a) Appearance (physical state, color, etc.);
- (b) Odor;
- (c) Odor threshold;
- (d) pH;
- (e) Melting point/freezing point;
- (f) Initial boiling point and boiling range;
- (g) Flash point;
- (h) Evaporation rate;
- (i) Flammability (solid, gas);
- (j) Upper / lower flammability or explosive limits;
- (k) Vapor pressure;
- (l) Vapor density;
- (m) Relative density;
- (n) Solubility(ies);
- (o) Partition coefficient: n-octanol/water;
- (p) Auto-ignition temperature;
- (q) Decomposition temperature;
- (r) Viscosity.

10. **Stability and Reactivity**

- (a) Reactivity;
- (b) Chemical stability;
- (c) Possibility of hazardous reactions;
- (d) Conditions to avoid (e.g., static discharge, shock, or vibration);
- (e) Incompatible materials;
- (f) Hazardous decomposition products.

#### 11. **Toxicological Information**

Description of the various toxicological (health) effects and the available data used to identify those effects, including:

- (a) Information of the likely routes of exposure (inhalation, ingestion, skin and eye contact);
- (b) Symptoms related to the physical, chemical and toxicological characteristics;
- (c) Delayed and immediate effects and also chronic effects from short- and long-term exposure;
- (d) Numerical measures of toxicity (such as acute toxicity estimates);
- (e) Whether the hazardous chemical is listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition) or by OSHA.

#### 12. **Ecological Information (non-mandatory)**

- (a) Ecotoxicity (aquatic and terrestrial, where available);
- (b) Persistence and degradability;
- (c) Bioaccumulative potential;
- (d) Mobility in soil.

#### 13. **Disposal Considerations (non-mandatory)**

Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.

#### 14. **Transport Information (non-mandatory)**










- (a) UN number;
- (b) UN proper shipping name;
- (c) Transport hazard class(es);
- (d) Packing group, if applicable;
- (e) Environmental hazards (e.g., Marine pollutant (yes/no));
- (f) Transport in bulk;
- (g) Special precautions, which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises.

#### 15. **Regulatory Information (non-mandatory)**

Safety, health and environmental regulations specific for the product in question.

#### 16. **Other information, including date of preparation or last revision**

## Appendix D: Hazard Communication Standard GHS Pictograms

HCS Pictograms and Hazards		
<p><b>Health Hazard</b></p>  <ul style="list-style-type: none"> <li>▪ Carcinogen</li> <li>▪ Mutagenicity</li> <li>▪ Reproductive Toxicity</li> <li>▪ Respiratory Sensitizer</li> <li>▪ Target Organ Toxicity</li> <li>▪ Aspiration Toxicity</li> </ul>	<p><b>Flame</b></p>  <ul style="list-style-type: none"> <li>▪ Flammables</li> <li>▪ Pyrophorics</li> <li>▪ Self-Heating</li> <li>▪ Emits Flammable Gas</li> <li>▪ Self Reactives</li> <li>▪ Organic Peroxides</li> </ul>	<p><b>Exclamation Mark</b></p>  <ul style="list-style-type: none"> <li>▪ Irritant (skin and eye)</li> <li>▪ Skin Sensitizer</li> <li>▪ Acute Toxicity</li> <li>▪ Narcotic Effects</li> <li>▪ Respiratory Tract Irritant</li> <li>▪ Hazardous to Ozone Layer (Non-Mandatory)</li> </ul>
<p><b>Gas Cylinder</b></p>  <ul style="list-style-type: none"> <li>▪ Gases Under Pressure</li> </ul>	<p><b>Corrosion</b></p>  <ul style="list-style-type: none"> <li>▪ Skin Corrosion/Burns</li> <li>▪ Eye Damage</li> <li>▪ Corrosive to Metals</li> </ul>	<p><b>Exploding Bomb</b></p>  <ul style="list-style-type: none"> <li>▪ Explosives</li> <li>▪ Self-Reactives</li> <li>▪ Organic Peroxides</li> </ul>
<p><b>Flame Over Circle</b></p>  <ul style="list-style-type: none"> <li>▪ Oxidizers</li> </ul>	<p><b>Environment (Non-Mandatory)</b></p>  <ul style="list-style-type: none"> <li>▪ Aquatic Toxicity</li> </ul>	<p><b>Skull and Crossbones</b></p>  <ul style="list-style-type: none"> <li>▪ Acute Toxicity (fatal or toxic)</li> </ul>