



## **Chemical Hygiene Plan**

2017 - 2018

## Table of Contents

<b>I. Overview</b>	3
Purpose	
Scope	
Responsibilities	
<b>II. Facilities and Supervision</b>	5
Facilities Descriptions	
Access	
Orientation to Lab Procedures	
Keys	
Hours of Operation	
Computer Use	
Communication regarding Handbook Changes	
Equipment Users	
<b>III. Chemical Laboratory Practices</b>	7
Standard Safety Practices	
Visitors	
Student Storage	
Phones	
Eyewear	
Laboratory Hazards	
Sources of Chemical Information	
Chemical Practice	
Labware	
Personal Protective Equipment	
Chemical Storage	
Emergency Response Equipment	
Chemical Accidents	
Chemical Deliveries	
<b>IV. Specific Chemical Hazards</b>	10
Acetone and Flammable Solvents	
Chlorinated Solvents	
Peroxides	
Gas Safety	
Liquid Nitrogen	
<b>V. Chemical Waste</b>	11
Disposal	
Waste Bottles	
Waste Handling	
<b>VI. Emergencies</b>	12
Procedures	
Fire Alarms	
Chemical Spills	
Medical Emergencies	
<b>VII. Appendices</b>	
Appendix 1: Terminology Associated with MSDS Sheets	13
Appendix 2: Daemen Staff Special Responsibilities	15

## I. SUMMARY: CHEMICAL HYGIENE PLAN

### **Purpose**

Daemen College has developed this Chemical Hygiene Plan (CHP) in compliance with the Occupational Safety and Health Administration (OSHA) Laboratory Standard Rules and Regulations. This Laboratory Standard is published as an amendment to 29 CFR 1910, Subpart Z, and identified as Section 1910. 1450.: Occupational Exposure to Hazardous Chemicals in Laboratories.

### **Scope**

This Chemical Hygiene Plan is a written program developed and implemented by Daemen College. This CHP sets forth procedures, equipment, personal protective equipment and work practices to protect employees from potential health hazards presented by hazardous chemicals used in the workplace.

At a minimum, this CHP covers employees (including student employees, technicians, researchers and faculty) who use chemicals in teaching and research laboratories at Daemen College. While the standard applies to employees, it is the policy of Daemen College that all users of the laboratories, including students and visitors, will be given training on practices and procedures related to chemical hazards and safe laboratory practices. It is incumbent upon the College as a community to ensure that all users read and understand these procedures and practices. Specific responsibilities are outlined as follows:

### **Responsibilities**

Daemen College President Gary A. Olson has the ultimate responsibility for chemical hygiene throughout the laboratories and with assistance of other program administrators, will provide continued support for chemical hygiene.

**Chemical Hygiene Officer** (institutional) is defined by the Standard as “an employee who is designated by the employer, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. This definition is not intended to place limitations on the position description or job classification that the designated individual shall hold within the employer's organizational structure.”

**Derrick Swartz**, Chemistry Lab Coordinator, serves as Daemen College's **Chemical Hygiene Officer**.

It is the responsibility of The Chemical Hygiene Officer to:

1. work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices,
2. act as advisor in procurement and use of chemicals in the lab, including determining that facilities and training levels are adequate for the chemicals in use,
3. perform regular, formal chemical hygiene and housekeeping inspections including inspections of emergency equipment,
4. help project directors develop precautions and adequate facilities,

5. maintain current knowledge concerning the legal requirements of regulated substances in the laboratory,
6. review and improve the Chemical Hygiene Plan on an annual basis,
7. ensure that employees know the chemical hygiene rules,
8. determine the proper level of personal protective equipment, ensure that such protective equipment is available and in working order,
9. ensure that appropriate training has been provided to employees,
10. monitor the chemical waste accumulation and coordinate its disposal.

**Laboratory Workers** (faculty, research assistants)

The laboratory workers are individually responsible for planning and conducting each laboratory operation in accordance with the Chemical Hygiene Plan. A list of each laboratory supervisory is provided in the facilities and supervision list.

## **II. FACILITIES AND SUPERVISION**

### **Description of Facilities**

The Natural Sciences Department has teaching laboratories on the west end of the second and third floor of Duns Scotus Hall and on the first floor of Schenck Hall. Research facilities are located in specific labs (DS 210, DS 307, DS 312 and SH 101b). Additionally, the Physical Therapy Department has one teaching lab on the first floor of Schenck Hall.

Each room has a responsible staff member or members who ensure that chemicals are stored appropriately and safety guidelines are followed. Table 1 lists the facilities, responsible parties and contact information.

Daemen College Chemical Hygiene Plan

**Table 1. Facilities Descriptions and Responsible Parties**

Room Number	Description	Special Equipment	Supervisor(s)	Phone (839-
DS 201/203	Chemistry Teaching Lab	Balances, Hoods	Mr. Derrick Swartz	8425
DS 202/204	Chemistry Teaching Lab	Hoods, AA	Dr. Robert Gunther Dr. Kathleen Murphy Dr. Sally Ann Smesko	8419 8236 7639
DS 203b	Chemistry Stockroom	Chemical Inventory	Mr. Derrick Swartz	8425
DS 206 / 208	Physics Teaching lab	Computers Physics equipment	Dr. Kristi Liddell Dr. Doug Kalinowski	566-7819 8546
DS 204b	Undergraduate Research lab	Microscope Nano-drop UV Thermocycler	Dr. Robert Gunther Dr. Kathleen Murphy, Mr. Derrick Swartz	8419 8236 8425
DS 205/207	Chemistry Teaching Lab	Hoods / FTIR	Dr. Caitlyn Montross	8405
DS 210/212	Chemistry Research/Teaching, Dept. Computer Lab	Instruments, balances, Computers	Dr. Kristi Liddell	566-7819
DS 302/304	Biology Teaching Lab	Microscopes	Ms. Cynthia Russell Dr. Brenda Young	8234 8366
DS 306	Biology Stockroom	Chemical Inventory	Ms. Cynthia Russell	8234
DS 307/311	Student Biology Research	Centrifuge, Freezer	Dr. Diane Ramos, Dr. Doug Kalinowski	8560 8546
DS 308/310	Biology Teaching Lab	Microscopes	Ms. Cynthia Russell Dr. Brenda Young	8234 8366
DS 313/315	Biology Teaching Lab	Microscopes, Thermocycler, Incubators	Dr. Doug Kalinowski, Dr. Diane Ramos	8546 8560
DS 312	Natural and Health Sciences Research Center	Freezer, Microscope, Computers, Image analysis, preserved specimens	Dr. Laura Edsberg	8351
SH 109	Biology Teaching Lab	Preserved specimens	Dr. Domenic D'Amore	566-7840
SH 101b	Biology Research	Growth Chambers	Dr. Diane Ramos, Dr. Brenda Young	8560 8366
SH 110	Biology Teaching Lab (Physical Therapy Dept.)	Preserved specimens	Dr. Gary Styn	8529

### **Access**

The facilities are for the exclusive use of Daemen staff and students affiliated with and working on specifically approved research projects as well as students enrolled in a laboratory course. Other use requires approval of the Director of the facility.

### **Orientation to Lab Procedures**

All student users must read the lab procedure guide and attend an orientation session led by a Daemen staff member. For laboratory courses, the first class meeting provides an introduction to the lab and a discussion of the appropriate safety procedures. Students are expected to sign a copy of the laboratory rules and submit the copy as indication of their understanding of the appropriate procedures. New staff members should meet with the laboratory coordinator for a similar orientation session.

### **Keys**

Keys are issued to approved Daemen staff members. Sharing of keys or permitting unauthorized access to the facility is not allowed. Students are not typically given keys to chemistry laboratories. Access to facilities can be provided by Daemen Security, provided that prior approval from the appropriate faculty supervisor is given.

### **Hours of Operation**

The laboratory facilities are open to approved faculty researchers both day and night, weekdays and weekends. Students in classes may not be in laboratory rooms (except DS 212) without a faculty or staff member present. If a student is completing independent research, his or her faculty research mentor is responsible for supervision in the laboratory setting. Certain instruments and procedures may be restricted to the normal work day, or only allowed in the presence of a designated staff member.

### **Computer Use**

Computers are available for Natural Sciences faculty, staff and students in DS 212. As noted in the departmental student handbook, students must submit an application prior to using these computers. Excessive printing will result in loss of privilege. Computer abuse is a violation of college policy.

### **Communication regarding changes to this Handbook**

E-mail will be the primary mechanism for notification of changes in procedure, facilities or equipment.

### **Equipment Users**

Access to the laboratory does not of itself permit use of any particular instrument. Most departmental equipment is available for use by any faculty member after orientation to that equipment. Each major instrument is under the charge of a staff member who can train users on that instrument and is responsible for the maintenance of that equipment. Student use of equipment requires faculty/staff training and supervision. Problems with equipment malfunctions, breakage, etc. should be reported to the appropriate staff member. Do not try to fix or adjust anything yourself.

### III. LABORATORY PRACTICES

#### Standard Laboratory Safety Practices

- No eating, drinking or smoking is permitted.
- Pipetting by mouth is strictly prohibited.
- Storage of food and drink is limited to non-laboratory areas.
- Cosmetics and/or lip balm must not be applied in the labs.
- Proper hygiene includes frequent hand washing, especially prior to leaving the laboratory.
- Lab coats or special clothing required in containment areas must be worn, buttoned, in the laboratory and removed when moving outside of the laboratory.
- Gloves must be worn whenever potentially biohazardous materials are handled.
- Glass and sharp objects must be disposed of in specially marked containers.
- Lab benches must be cleaned regularly. In the event of spills or contamination cleanup is to be done immediately.
- Animals not involved in the project are not permitted in the laboratories.

#### Visitors

Visitors should be escorted through laboratory facilities and should not enter a laboratory without appropriate eyewear, if experiments requiring eye protection are in progress. Only approved faculty or staff may escort visitors into lab facilities.

#### Student Storage

A limited amount of storage space, mostly in the form of small drawers, is available for student use in the laboratories. These drawers should be kept neat and emptied at the end of the semester or termination of the research project. Personal belongings left in departmental facilities may be discarded.

#### Phones

Phones are provided in several laboratory rooms. Students should not routinely make or receive calls at the lab.

#### Eyewear

Safety glasses must be worn in the Daemen laboratories when instructed by a staff member. Safety glasses are provided for student use or may be purchased. Students who repeatedly refuse to wear their eye protection will be asked to permanently leave the lab.

Contact lens wearers should exercise caution when working with chemicals, including preservatives associated with dissection material. Individuals who wear contacts do so at their own risk.

Safety is an overriding concern in all Daemen laboratory activities. As a general rule, anyone violating any safety rule or otherwise compromising his or her personal safety or the safety of others will be denied future access to the laboratory. These suspensions are at the discretion of the department chair, lab coordinators or research director.

### **Laboratory Hazards-Chemical**

Care should be taken in the use of chemicals in our labs. The chemicals we commonly use can cause severe burns, tissue damage, organ damage, asphyxiation, and genetic damage if improperly used. These chemicals can enter the body by inhalation, ingestion, or absorption (either directly through the skin or through gloves) and may have either long or short-term health consequences. In addition, improper use of solvents can result in a major fire.

### **Sources of Chemical Information**

The Materials Safety Data Sheet (MSDS) is a convenient, condensed source for information on the properties of any chemical. The MSDS is a federally-mandated document which must be supplied by the manufacturer or seller of a chemical. It contains in summary form, the chemical composition, the physical and chemical properties, toxicology data, and instructions for handling, spill control, and waste disposal. Users should read the MSDS for every chemical handled.

Safety data sheets for all chemicals approved for use in the laboratory are available in the MSDS binder located in the laboratory (copies available to individuals from the departmental secretary in DS 211). Each lab has a listing of all chemicals present in the room and the department has a computerized database for all chemicals. Definitions associated with terminology associated with MSDS sheets are provided in Appendix 1.

### **Chemical Practice**

**All chemicals in current use in the laboratory should be labeled.** Users must clearly label all containers (beakers, bottles, etc.) with user's name, the chemical name (not formula or short hand), date, and time. This will save the staff and users considerable time in identifying forgotten or spilled chemicals.

Due to the limited available hood space, chemicals should be removed from the hoods when no longer needed. Often there will be several people working in the same hood. The first user in the hood, however, has the option to exclude others from the area while he/she is working, for either safety or process reasons. Unlabeled chemicals and samples are subject to confiscation.

### **Labware**

Clean glassware and plasticware are available for all to use in the laboratory. All users are responsible for cleaning their own glassware unless previous arrangements are made. Dirty items should not be left in the sink as subsequent users will not know what chemicals are present on these items. All glassware should be rinsed three times and placed on a drying rack or in its appropriate storage cabinet.

### **Personal Protective Equipment**

A variety of protective gear for chemical use is provided for use in the facility. Aprons, face shields, goggles, and appropriate gloves are available in the chemistry stockroom.

### **Chemical Storage**

We have limited chemical storage space in the laboratories. Mix only as much chemical as you need for the immediate week. In most cases, the shelf life of these mixtures is very short anyway. All special chemicals and solutions must be labeled with name and date. Chemicals older than 3 years will be periodically disposed of without question.



### **Emergency Response Equipment**

Emergency showers and eye washes are located in all chemistry laboratories. Most chemical burns, particularly in the eyes, should be washed for 20 minutes before seeking further medical attention. Note that these washes have no drains; a lot of water will end up on the floor but this is unimportant in an emergency.

**First Aid Kits** are available in all laboratories. Please notify the room supervisor when supplies are used so that they may be replaced.

### **Chemical Accidents**

Individuals are primarily responsible for cleaning up their minor chemical spills, using safe and approved procedures. Users should request assistance from the staff for any significant spill. Contaminated rags and broken chemically laden glass should not be placed in the normal waste baskets; these should be rinsed, bagged, labeled and stored in a ventilated hood until a staff member can assist in disposal.

For major chemical spills and for any unanticipated chemical reaction, everyone must evacuate the area or the laboratory and call Daemen Security (x8246) and remain available to provide information. Daemen College has no general purpose emergency response team. If deemed serious, the fire alarm in the hall outside the laboratory may be pulled to signal evacuation.

After the accident, a written report should be given to the Chemical Safety Officer. Explanations should describe the event, procedures taken, injuries or damage that occurred and actions required to prevent future similar events.

### **Chemical Deliveries**

Chemical orders with special handling requirements (e.g. special packing or temperature requirements) upon delivery, should be noted on the purchase order and the departmental secretary in DS 211 should be informed prior to the delivery. The departmental secretary should be notified for gas tank replacement.

## **IV. SPECIFIC CHEMICAL HAZARDS**

### **Acetone and Flammable Solvents**

Acetone is a very flammable solvent with a low flash point, (i.e. it can be ignited at a low ambient temperature). Because of this it presents a significant fire hazard. A spill of a gallon bottle of acetone could cause a catastrophic fire or explosion.

Solvents should also be handled with care in the hoods and not used near hot plates. Spilled solvent can be ignited by the hot plates. The resulting fire could easily be drawn up into the exhaust ducts, again with catastrophic consequences.

### **Chlorinated Solvents**

Chlorinated solvents are particularly dangerous, causing cancer, organ damage, etc. They should not be mixed with normal solvents in waste bottles. There are separate waste bottles for chlorinated solvents. As with most solvents, they can be readily absorbed through the skin.

### **Peroxides**

All peroxides are highly oxidizing materials. Considerable energy can be released in their reactions with common materials. Some peroxide compounds are unstable, and can explode. Extreme care should be used in mixing solutions containing peroxides. Peroxides are incompatible with all forms of organic solvents and flammable materials.

### **Gas Safety**

The gases used within the facility for processing are generally supplied under high pressure from steel compressed gas cylinders. In most cases, these cylinders are housed in special gas cabinets and fitted with a variety of high purity valves, regulators and flow control devices. Gas cylinders must be treated with respect in all cases. An enormous amount of energy is stored in the compressed gas. In addition, many of these gases are toxic, or at least severely corrosive. Finally, improper use of gas cylinders and valves can result in contaminated gas and ruined samples and equipment.

Compressed gas equipment in the facility is not user serviceable. Gas bottles are to be changed only by the appropriate staff members.

### **Liquid Nitrogen**

Liquid nitrogen is used to keep biological material at low temperatures. Our dewars are filled by a trained representative from the supply company. Exercise care when putting material into liquid nitrogen as it may splash onto skin and damage it. Chilled material should be handled with care to prevent tissue damage.

## **V. CHEMICAL WASTE**

### **Disposal**

Disposal of waste chemicals is an area of great concern and is extremely expensive. All chemical waste is to be collected, consolidated, bottled and sent out as regulated chemical waste. The Chemical Safety Officer will arrange for waste removal by a licensed waste hauler. The waste is burned, neutralized, or buried in licensed facilities, in accordance with EPA rules. Certain wastes by federal law, e.g., arsenic, cannot be buried. Furthermore, the waste hauler will take only certain wastes. It is extremely important that all waste is appropriately labeled. The cost for waste disposal is dependent on the type of chemical waste and its volume. Hazardous waste removal is expensive, so try to limit your amounts. Routine waste should not be mixed with hazardous waste. Small amounts of certain chemicals can be flushed down the drain – please consult with the Chemical Safety Officer for the proper treatment of waste.

### **Waste Bottles**

Waste bottles in use are generally kept at one side of the hood in each laboratory. Please keep them neat and use a funnel when filling to prevent dissolving the labels. Do not fill the waste bottles to the top, as later thermal expansion will cause overflow or bottle breakage. All waste bottles must be labeled with the type of waste and the words “Hazardous Waste” and should be kept under the hood with the hood turned on. Please see the Safety Officer or the staff member responsible for waste chemicals if you have questions about waste handling.

### **Waste Handling**

All empty containers must be thoroughly washed inside and out. Dilute rinse water may go down the drain. Flowing water into the bottle is probably not sufficient. Please fill and dump several times. The residual chemical must be diluted by three or four orders of magnitude.

## VI. EMERGENCIES

### Procedures

In the event an emergency should arise, the following procedures should be followed:

- If it is of a serious nature that requires police, rescue squad and/or ambulance, dial 911 immediately.
- Always **call Security at x8246**. Give them the precise location and the name of the individual(s) involved. Security will assist medical authorities in finding their way around campus. It is imperative that Security is alerted to any emergency.
- If the emergency involves a student, Security will alert the Student Affairs office, as well as Susan Girard, Health Services Coordinator, so she can assist the emergency team by providing pertinent information (e.g., allergies to medications) in the event the student cannot speak for him/herself. Only essential information will be released. Confidentiality of health records is safeguarded at all times.
- In our efforts to maintain confidentiality, individuals should remove themselves from the immediate emergency area once assistance has arrived. This will not only give better access to rescue personnel, it will help ensure that confidential information is not overheard beyond those individuals who need to know. Individuals may be asked to complete an accident/incident report for Security.
- Family Care Medical Center, located at 61 Maple Rd. in Williamsville (565-1234) is the primary health care provider (non-emergency situations) for Daemen College students enrolled in the Daemen College Student Health Insurance Program. Family Care will provide health care to any Daemen student and will work with other insurance carriers. Family Care has agreed to give priority appointments to our students, but they do ask our cooperation in calling their office first to avert scheduling conflicts. Walk-in hours are available 8 a.m. -11a.m. on Saturdays.

### Fire Alarms

Daemen College is required to conduct three announced fire drills each year. Please respond to all alarms as if they are real. You should always exit the laboratory, using the closest exit. In the event of an emergency, please pull the alarm nearest to the source of the emergency. Security will respond to the site of the pulled alarm and will notify the fire department and direct them to the emergency alarm and will notify the fire department and direct them to the emergency site if needed. The fire department will answer all calls and will respond to the site of the pulled alarm.

### Chemical Spills

If your body or clothes have been wet with chemicals, use the emergency showers and eye wash immediately. Small areas may be better washed in the sink. Remove all contaminated clothing. If you have chemical burns, take care of yourself first and have someone else take care of the chemical spill.

Do not dispose of the spill control materials, broken bottles, and other contaminated items in the waste basket. Bag them up, leave them in a hood, and request assistance from a staff member. In cases of chemical spills, you are responsible for cleaning up, or at least notifying the staff.

### **Medical Emergencies**

In medical emergencies, administer first aid, CPR, etc. as appropriate. You should also call security. Please explain the type of problem and the type of help requested. Daemen security will be able to request additional emergency medical personnel.

## **APPENDIX 1**

### **Terminology Associated with MSDS Sheets**

The following terms are often encountered when reading about the properties of chemicals and the toxicity of chemicals, for example, on the Material Safety Data Sheets. Simple definitions are included here to aid in understanding the properties of common chemicals or types of exposure when referring to the MSDS or other references. This is not intended to be a complete reference on toxicology or chemical safety.

**Pyrophoric** chemicals spontaneously ignite in air. No source of ignition (spark) is needed. They react spontaneously when exposed to oxygen.

**Flash point** is the minimum temperature of a liquid at which it gives off sufficient vapor to form an ignitable mixture with air. Liquids with a flash point near room temperature can be ignited very easily during use.

**Exothermic Reaction** is a reaction which produces heat (releases energy).

**Acute Exposure** as used in toxicology refers to a short-term exposure. It has nothing to do with either the severity of the exposure or the severity of the effect. The type of exposure occurring during an accidental chemical spill is properly described as an acute exposure.

**Chronic Exposure** as used in toxicology refers to a long-term exposure. Again, it has nothing to do with the severity of the exposure, the severity of the consequences, or the duration of the consequences. Chronic exposures can be the result of chemicals in the workplace, the home, or the environment. Chronic exposures are usually the result of carelessness, ignorance, or neglect, and not the result of an accident.

**Local Exposure** refers to exposure limited to a small area of skin or mucous membrane.

**Systemic Exposure** means exposure of the whole body or system, through adsorption, ingestion, or inhalation.

**Acute Effects** refers to the duration of the symptoms. Acute means symptoms lasting a few hours or days. Again, it has nothing to do with the severity of the effects.

**Chronic Effects** are long-term effects, manifested by prolonged duration and continuing injury

**Local Effects** occur in a small area, at the place of contact.

**Systemic Effects** occur throughout the body, or at least away from the point of contact.

**Allergies and Hypersensitivity** are reactions by particular individuals to particular chemicals, caused by heredity or prior overexposure. Hypersensitive individuals should avoid exposure to the offending agents.

**STEL - Short Term Exposure Limit - Actually TLV-STEL.** Maximum concentration to which a person can be exposed for 15 minutes, up to 4 times a day without adverse effects.

**PEL- Permissible Exposure Limit** - The statutory equivalent of TLV.

**LD<sub>50</sub>** - The dose at which 50 % of those exposed will die. Separate levels apply to various modes of exposure (inhalation, dermal, etc.). Usually expressed in terms of mg per kg of body weight; often measured for mice and rats, for obvious reasons. All these levels are approximate, with considerable inconsistency between various sources.

**Carcinogen**- A substance producing or inciting cancerous growth.

**Mutagen**- Capable of inducing mutations.

**Teratogen**- A substance causing damage or death to a fetus.

## **APPENDIX 2**

### **Daemen Staff Special Responsibilities**

Natural Sciences Department Chair: Dr. Douglas Kalinowski

Chemical Safety Officer: Mr. Derrick Swartz

Director of Natural and Health Sciences Research Center: Dr. Laura Edsberg

Director of Physical Plant Maintenance and Safety Officer: Mr. Don Phillips