SUMMARY: The Personal Protective Equipment (PPE) Guideline has been developed to provide the University of Michigan – Dearborn (UM-Dearborn) community with the necessary information to identify work situations that require the use of PPE, make the proper selection of PPE, and the importance of documenting this information. This information is important to help ensure the safety and health of all UM-Dearborn employees.

SCOPE: University employees that currently utilize PPE or have the potential to encounter hazards to the eyes, face, head, feet, hands, or conduct work involving electrical or fall hazards, as identified during the Hazard Assessment of the workplace, will be included under this PPE Guideline.

PPE will be selected and used to protect employees from the hazards and potential hazards that are likely to be encountered. PPE must be purchased and provided at no cost to the employee, including temporary and part time staff. Coverage for prescription eyewear has special requirements that are covered in Appendix C.

Respiratory and hearing protection is covered under separate guidelines. See Respiratory Protection and Hearing Conservation Guidelines.

PPE should not be used as a substitute for engineering, work practices, and/or administrative controls to protect employees from workplace hazards. PPE should be used in conjunction with permanent protective measures, such as engineered guards, substitution of less hazardous chemicals, and prudent work practices.

REFERENCE REGULATIONS: MIOSHA Personal Protective Equipment Standards for General Industry Part 33 and for Construction Part 6.

ANSI Standards for Occupational and Educational Eye and Face Protection Z87.1-1989 or Z87.1-2003 (General Industry) and Z87.1-1991 (Construction), Protective Headwear for Industrial Workers (Z89.1-1986 or Z89.1-2003), and Personal Protective Footwear (Z41-1991).

ASTM International Standards: F2412-05 Standard Test Methods for Foot Protection and F2413-05 Standard Requirements for Protective Footwear

DEFINITIONS: *ANSI* - American National Standard Institute, a nonprofit, voluntary membership organization that coordinates the U.S. Voluntary Consensus

Standards System. Their standards have been adopted throughout government and industry for various types of personal protective equipment.

ASTM International – American Society for Testing and Materials, a voluntary standards development organization and a source for technical documentation for industries worldwide. *Hazard Assessment* - investigating the work environment for potential dangers that could result in an injury or illness.

Bump Cap (Hat) – a device worn on the head to protect the wearer from bumps or blows but which does not meet the requirements of class A, B, C, or D protective helmets.

Face Shield – a device worn in front of the eyes and a portion or all of the face, whose prominent function is protection of the eyes and face.

Goggle – a device with contour-shaped eyecups or facial contact with glass or plastic lenses, worn over the eyes and held in place by a headband or other suitable means for the protection of the eyes and eye sockets.

Hazard Assessment – investigating the work environment for potential dangers that could result in an injury or illness.

Material Safety Data Sheet (MSDS) – an informational tool developed by chemical manufacturers containing the following information for a hazardous chemical: substance identification and synonyms, hazardous components (if mixture), physical data, fire and explosion data, toxicity data, health effects and first aid, reactivity, storage and disposal procedures, spill and leak procedures, and recommended protective equipment. MSDS can be obtained from the chemical suppliers and many Internet sites.

Personal Protective Equipment (PPE) - devices worn by workers to protect against hazards in the environment. Examples include safety glasses, face shields, respirators, gloves, hard hats, steel-toed shoes, and hearing protection.

Plano (Lens) – a lens which does not incorporate correction.

Radiant Energy (or Radiation) –three kinds of radiant energy:
1. Ultraviolet
2. Visible Light
3. Infrared

Side Shield – a device of metal, plastic, or other material fixed to a spectacle lens frame to protect an eye from side exposure.

Spectacle – a device patterned after conventional-type spectacle eyewear, but of more substantial construction, and with plano or corrective impact resistant lenses.

RESPONSIBILITY: Deans, Directors, and Department Heads

Ensure this guideline is implemented and maintained within your department.

Designate and empower individuals who will be responsible for the preparation and implementation of the Personal Protective Equipment Program.

Provide administrative and financial support for this Guideline within individual departments.

Supervisors

Implement all aspects of this Guideline, including documentation of the hazard assessments and training. The supervisor has been designated this responsibility, as they are involved with employees on a daily basis.

Conduct hazard assessments and ensure that employees are informed, trained, and provided with appropriate PPE to be protected from potential hazards associated with job tasks. A Hazard Assessment checklist has been included in Appendix A. If assistance is needed contact the Department of Environmental Health and Safety (EHS) for assistance.

Be familiar with the applicable government regulations, safety standards, and prudent safety practices to protect themselves and their fellow employees (University's Standard Practice Guide (SPG) 201.45, 605.1, 605.2).

Follow Work~Connections procedures if there is an accident or injury; http://www.workconnections.umich.edu/forms.html

Employees

Comply with this Guideline and any further safety recommendations provided by supervisors and/or EHS regarding PPE.

Conduct assigned tasks in a safe manner and wear all assigned PPE.

Report any unsafe or unhealthy work conditions and job related injuries or illnesses to the supervisor immediately.

Environmental Health and Safety (EMS)

Provide technical information and assist departments in implementing an effective PPE program in their workplace.

Review and revise the PPE program, as needed for compliance with applicable regulations.

PROCEDURES: *General* - The following steps are necessary to achieve compliance with the PPE Guideline:

1. *Conduct a Hazard Assessment of the Workplace*

A hazard assessment is not a new process; it is simply a formalization of what is done whenever personal protective equipment is selected based on the hazards of the job. When conducting a hazard assessment, a task is investigated and the hazards and the potential hazards associated with the task are determined. This allows selection of personal protective equipment that will protect the employee from the identified hazards.

A hazard assessment may be conducted on a single employee, on a single task, or on a group of employees if all the employees perform an identical task. For example, if all employees in a group are exposed to ultraviolet radiation during one type of welding, the hazard assessment could include all of the welders conducting that task. Likewise, painters using similar types of materials or laboratory workers using similar types of chemicals could be grouped under the same assessment.

The individual conducting the hazard assessment must have an intimate knowledge of each task; this is the rationale for the supervisor to conduct the hazard assessment. In some cases this may require directly observing an employee. In other instances the assessor may know all the hazards associated with a job without additional review.

During the hazard assessment of each task, inspect the layout of the workplace and look for the following hazard sources:

a. High or low temperatures
b. Chemical exposures (use MSDS's for guidance)
c. Flying particles, molten metal or other eye, face, or skin hazards
d. Light radiation, e.g., welding, arc lamps, heat treatment, lasers
e. Falling objects or potential for dropping objects

f. Sharp objects
g. Rolling or pinching that could crush the hands or feet
h. Electrical hazards

Where these hazards could cause injury to employees, personal protective equipment must be selected to substantially eliminate the injury potential. A Certification of Hazard Assessment form is located in Appendix A that supervisors can use to identify potential workplace hazards.

2. *Certify a Hazard Assessment was Performed*

By signing the Certification of Hazard Assessment forms you certify the accuracy of the information. This document helps ensure supervisors are aware of what PPE is required for certain tasks. It is hoped this will encourage supervisors to remind their staff to wear their PPE. The forms must be maintained with departmental records. In laboratories, the forms must be kept with the Chemical Hygiene Plan.

3. *PPE Selection Guidelines*

a. General Considerations

For each hazard identified, select personal protective equipment that will protect the employee by creating a barrier against workplace hazards. Consider the likelihood of an accident and the seriousness of a potential accident. Personal protective equipment must be selected to protect against any hazard or seriously injury that is likely to occur.

It is important for department personnel to become familiar with the potential hazards, the type of protective equipment that is available, and the level of protection that is provided by that equipment, i.e., splash protection, impact protection, etc.

All PPE determined in the Hazard Assessment to be necessary, must be provided at no cost to the employee according the SPG 201.45. The same holds for temporary or part time staff requiring PPE. EHS has programs in place to offset the cost of the more costly items i.e. prescription safety glasses and respiratory protection. Departments are responsible for the purchase of all other PPE not provided by EHS.

Departments hiring temporary and part-time staff may require PPE be provided by the employee if the Hazard Assessment indicates the need.

The personal protective equipment selected must fit the employee it is intended to protect. Make certain that employees have the correct size of protective equipment. Whenever possible, select adjustable personal protective equipment.

Employee input in the selection process is critical. Personal protective equipment that fits properly and is comfortable will more likely be worn by employees. Damaged or defective protective equipment shall be immediately taken out of service to be repaired or replaced.

For the proper selection of PPE, please use the following resources:

i. Information presented on the following pages of this document;
ii. Appendix A guides: Eye and Face Protection Chart, Filter Lenses for Protection against Radiant Energy Chart
iii. Technical assistance from the EHS and the manufacturers of PPE
iv. MSDS for chemicals
v. University M-Marketsite website (product description search).

b. Eye and Face Protection

The use of eye and face protection shall be used where a hazard exists due to flying objects or particles, molten metal, liquid chemicals, gases, vapors, or injurious light radiation. Select eye and face protection based on Tables I and Table II in Appendix A.

Contact lens wearers should also be aware that dirty and/or chemical environments may present additional hazards. Chemical vapors can penetrate the lens causing damage to the eye. Proper eye protection should always be utilized instead of, or in conjunction with contact lenses. Refer to Appendix B for additional information.

If the appropriate protection is not listed in the tables, such as laser eyewear, refer to the Laser Guideline or contact EHS for further assistance. All protective eye and face protection must comply with ANSI Z87.1-1989 (or ANSI Z87.1-2003) for General Industry and ANSI Z87.1-1991 for Construction Industry. EHS will provide one pair of approved prescription safety eyewear to Dearborn campus employees who meet certain criteria. See Appendix C for how to obtain prescription safety glasses.

c. Head Protection (Hard Hats)

Protective helmets are designed to shield the head from the impact and penetration of falling objects, working in low clearance areas, and in some

cases high voltage electric shock and burns. They should be worn whenever the potential exists for injuries to the head due to falling objects or when head clearance is restricted. For example, operations requiring head protection may include: tree trimming, construction and demolition work, electric and communication line maintenance.

Head protection is also required where there is a risk of injury from electric shock, hair entanglement, chemicals, or temperature extremes.

Be certain that hard hats provided are not bump caps. To check this, inspect each hard hat to confirm that it contains the designation "ANSI Z89.1986" or "ANSI Z89.1-2003". Bump caps cannot be used to protect employees from falling objects. Bump caps are used only for low clearance areas. Knowledge of potential electrical hazards is important when selecting head protection.

Three classes of hard-hats are available:

Class A/Class G (General) helmets, in addition to impact and penetration reisitance, provide electrical protection from low voltage conductors (they are proof tested to 2,200 volts).

Class B/Class E (Electrical) helmets, in addition to impact and penetration resistance, provide electrical protection from high voltage conductors (they are proof tested to 20,000 volts).

Class C helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards.

d. Foot Protection

Select protective footwear when employees work in areas where there is a danger of foot injuries due to falling and rolling objects, objects piercing the sole, and where employees' feet are exposed to electrical hazards. Protective footwear must comply with ASTM (American National Standards Institute standards F2415-05 and F2413-05, Standards Test Methods for Foot Protection and Standard Requirements for Protective Footwear.

Where a hazard is created from a process, environment, chemical or mechanical irritant which could cause an injury or impairment to the feet by absorption or physical contact, other than from impact, footwear, such as boots, overshoes, rubbers, etc. shall be used.

Examples of situations which may require the use of protective footwear include:

i. handling heavy objects and/or tools that could be dropped
ii. work activities involving manual material handling carts, heavy pipes, or bulk rolls, all of which could potentially roll over an employee's foot or heavy meet certain criteria
iii. work involving sharp objects such as nails, tacks, large staples, scrap metal, etc., which could penetrate the sole of the shoe

(The employee's department is responsible to pay for protective footwear.)

e. Hand Protection

Select and use the appropriate hand protection when employees' hands maybe potentially exposed to the following hazard sources:

i. skin absorption of harmful substances
ii. severe cuts or lacerations
iii. severe abrasions
iv. punctures
v. chemical burns
vi. harmful temperature extremes

It is important to select the appropriate glove for a particular application and to determine how long the glove can be worn, and whether it can be reused. Chemically protective gloves should be selected based on tested performance against specific chemicals. Glove manufacturers have developed recommendations for the proper selection and use of chemically-protective gloves.

Contact the manufacturer directly or EHS for assistance. For online recommendations go to:
http://www.microflex.com/Products/~/media/Files/Literature/Microflex%20Chemical%20Resistance%20Guide.ashx
https://www.vwrsp.com/safety/pdf/2003-july_glove_selection.pdf
http://www.showabestglove.com/site/languageselection/?redirectpage=http:$$www.showabestglove.com$site$chemrest$default.aspx
http://www.saftgard.com/
http://www.ansellpro.com/specware/guide.asp
http://www.mapaglove.com/ChemicalSearch.cfm?id=1
http://www.polyco.co.uk/downloads/chemical_resistance_guide.pdf
http://training.mcrsafety.com/permeation/index.shtml

f. Skin Protection, Other than Gloves

Skin protection should be worn when there is a possibility of chemical splashes to the body, when the atmosphere may contain contaminants that could damage the skin or be absorbed by the skin, or when contaminants could remain on the street clothes of an employee. The amount of coverage is dependent on the area of the body that is likely to be exposed. For small controlled processes, an apron may be sufficient; for work above the head, a full body coverall may be required.

The process for selecting chemically resistant clothes is similar to that for gloves. Please check the manufacturer's recommendations for the proper selection of chemically-protective clothing.

4. *Consultation With Affected Employees*

Include employees in the PPE selection process to the extent possible and provide access to the Certification of Hazard Assessment form.

5. *Training Guidelines*

Training must be provided to each employee who is required to use PPE. Each employee must be trained to know at least the following:

i. When and why personal protective equipment is necessary
ii. What personal protective equipment is necessary
iii. How to properly don, doff, adjust and wear personal protective equipment
iv. The limitations of the personal protective equipment
v. The proper care, maintenance, useful life and disposal of the personal protective equipment.
vi. Laboratory personnel must be instructed to remove gloves and lab coats prior to entering common areas (hallways, elevators, eating areas, rest rooms, offices, etc.). Secondary containers should be used for transport of potentially hazardous materials or agents.

Each employee shall demonstrate an understanding of the training and the ability to use personal protective equipment properly before being allowed to perform work requiring the use of PPE.

Supervisors are responsible for providing training. Ideally, this training should be part of the Hazard Communication training or the Lab Safety training your employees receive. EHS can assist in conducting General Lab Safety training.

Any training format can be used as long as a hands-on session is included.

The length and complexity of training should reflect the complexity of the personal protective equipment to be used. For example, training may be an informal hands-on session only, or it may be a longer video-based session followed by hands-on training. Appendix B is a "Supervisor's Guide to Employee Training" which can be discussed, or distributed to employees. EHS is available to conduct training upon request.

6. *Training Certification*

Certify in writing that the training was completed. Maintain the certification with your departmental training records. Laboratories must keep the certification with the Chemical Hygiene Plan.

The certification must verify that each affected employee has received and understood the required training. The record must be identified as a certification. A Training Certification form is provided in Appendix B.

A PPE program guide and handout for University employee is included in Appendix D.

7. *Reassessment and Retraining*

Reassessment of the workplace should be conducted when new equipment or processes are introduced that could create new or additional hazards. Accident records should be reviewed and the suitability of previously selected PPE be reevaluated, if warranted.

When the supervisor has reason to believe that any affected employee who has been trained does not have the understanding or skills required to use the personal protective equipment properly, the supervisor shall retrain such employees.

Retraining is also required when there have been changes in the workplace or personal protective equipment that render previous training obsolete, or when there are inadequacies in the affected employee's knowledge or use of the assigned personal protective equipment.

TECHNICAL SUPPORT: All referenced guidelines, regulations, and other documents are available through University Police Department & Environmental Health and can be contacted by the Facility Operations Call Center (593-5270).

ATTACHMENTS: Appendix A - Hazard Assessment Form and PPE Selection Guides

Appendix B - Employee Training Guidelines
Appendix C – Obtaining Prescription Safety Glasses
Appendix D – Summary Guide and Handout for University Staff

APPENDIX A

CERTIFICATION OF HAZARD ASSESSMENT

Job Title
Department
Location
Employee Name(s) **see below**

Date
Supervisor
Analysis by
Signature

Tasks	Potential Hazard	PPE Recommended

SUPPLEMENT TO THE HAZARD ASSESSMENT

Table I. Eye and Face Protection Selection Chart

TYPE	HAZARD(S)	ASSESSMENT SEE NOTE (1)	PROTECTOR TYPE (refer to graphic)	PROCTECTORS	LIMITATIONS	NOT RECOMMENDED
IMPACT	Chipping, grinding machining, masonry work, riveting, and sanding	Flying fragments, objects, large chips, particles, sand, dirt, etc.	B, C, D, E, F, G, H, I, J, K, L, N	Spectacles, goggles, face shields. **SEE NOTE (1)(3)(5)(6)(10)** For severe exposures add N.	Protective devices do not provide unlimited protection. **SEE NOTE (7)**	Protectors that do not provide protection from side exposure **SEE NOTE (10)** Filter or tinted lenses that restrict light transmittance, unless it is determined that a glare hazard exists. Refer to **OPTICAL RADIATION**
HEAT	Furnace operations, pouring, casting, hot dipping, gas cutting, and welding	Hot sparks	B, C, D, E, F, G, H, I, J, K, L, N	Face shields, goggles, spectacles *For severe exposure add N **SEE NOTE (2)(3)**	Spectacles, cup and cover type goggles not provide unlimited protection. **SEE NOTE (2)**	Protectors that do provide protection from side exposure
		Splash from molten metals	*N	*Face shields worn over goggles H, K	–	
		High temperature exposure	N	Screen face shields, reflective face shields **SEE NOTE (2)(3)**	**SEE NOTE (3)**	
CHEMICAL	Acid & chemical handling, degreasing, plating	Splash	G, H, K, *N	Goggles, eyecup, and cover types	Ventilation should be adequate but well protected from splash entry.	<NONE>
		Irritating Mist	G	Special purpose goggles	**SEE NOTE (3)**	
DUST	Woodworking, buffing, general dusty conditions	Nuisance dust	G, H, K	Goggles, eyecup, and cover type	Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleaning may be required.	<NONE>
OPTICAL RADIATION	Welding: Electric Arc		O, P, Q	**TYPICAL FILTER LENS SHADE** / **PROTECTORS**: 10-14 — Welding Helmets or Welding Shields; **SEE NOTE (9)**	Protection from optical radiation is directly related to filter lens density. **SEE NOTE (4)** Select the darkest shade that allows adequate task performance.	Protectors that do not provide protection from optical radiation. **SEE NOTE (4)**
	Welding: Gas / Cutting / Torch Brazing		J, K, L, M, N, O, P, Q	4-8 / 3-6 / 3-4 — Welding Goggles or Welding Shields	**SEE NOTE (3)**	
	Torch Soldering		B, C, D, E, F, N	1.5-3 — Spectacles or Welding Faceshield		<NONE>
	Glare		A, B	Spectacle **SEE NOTE (9)(10)**	Shaded or special purpose lenses as suitable **SEE NOTE (8)**	

NOTES TO TABLE I. EYE AND FACE PROTECTION SELECTION CHART:

(1) Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards should be provided. Protective devices do not provide unlimited protection.

(2) Operations involving heat may also involve light radiation. As required by the standard, protection from both hazards must be provided.

(3) Faceshields should only be worn over primary eye protection (spectacles or goggles).

(4) As required by the standard, filter lenses must meet the requirements for shade designations in 1910.133(a)(5). Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.

(5) As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eyewear.

(6) Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.

(7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.

(8) Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.

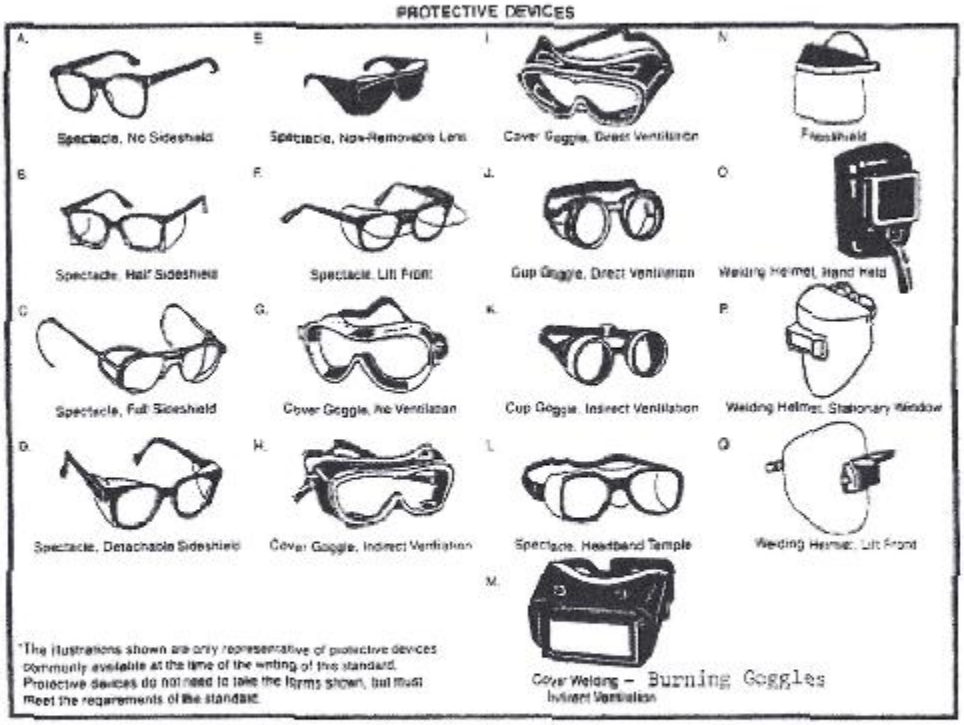
(9) Welding helmets or faceshields should be used only over primary eye protection (spectacles or goggles).

(10) Non-sideshield spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for "impact."

(11) Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.

(12) Protection from light radiation is directly related to filter lens density. See note (4). Select the shade

PROTECTIVE DEVICES



*The illustrations shown are only representative of protective devices commonly available at the time of the writing of this standard. Protective devices do not need to take the forms shown, but must meet the requirements of the standard.

Table II. Filter Lenses for Protection Against Radiant Energy

Operations	Electric Size 1/32 in.	Arc Current	Minimum* Protective Shade
Shielded metal arc welding	Less than 3 3 - 5 5 - 8 More than 8	Less than 60 60 - 160 160 - 250 250 - 550	7 8 10 11
Gas metal arc welding and flux cored arc welding		Less than 60 60 - 160 160 - 250 250 - 500	7 10 10 10
Gas Tungsten arc welding		Less than 50 50 - 150 150 - 500	8 8 10
Air carbon Arc cutting	Light Heavy	Less than 500 500 - 1000	10 11
Plasma arc welding		Less than 20 20 - 100 100 - 400 400 - 800	6 8 10 11
Plasma arc cutting	Light** Medium** Heavy**	Less than 300 300 - 400 400 - 800	8 9 10
Torch soldering Torch brazing Carbon arc welding			2 3 14

Operations	Plate Thickness - inches	Plate Thickness - mm	Minimum* Protective Shade
Gas Welding:			
Light	Under 1/8	Under 3.2	4
Medium	1/8 to 1/2	3.2 to 12.7	5
Heavy	Over 1/2	Over 12.7	6
Oxygen Cutting:			
Light	Under 1	Under 25	3
Medium	1 to 6	25 to 150	4
Heavy	Over 6	Over 150	5

* As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

** These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workplace.

Hazard Assessment Checklist

Conduct a walk-through survey of the workplace operations or processes to determine if hazards are present, or are likely to be present, which necessitate the use of PPE. The purpose of the survey is to identify sources of hazards to the head, eyes, face, hands, feet, and skin of employees in order to enable the proper selection of protective equipment. Each of the following basic hazard sources should be reviewed, checked off, and a determination made as to the type, level of risk, and seriousness of potential injury. Remember PPE is <u>not</u> a substitute for engineering, work practice and/or administrative controls.

HAZARD SOURCE	YES (✓)	BODY PART AFFECTED (e.g. eye, face, head, hands, feet, or skin)	PPE SELECTED (e.g. gloves, hard hat, safety shoes, eye or skin protection, etc.)	NO (✓)
Motion, e.g., movement of machinery or processes, tools, machine elements, particles, or personnel.				
High temperatures that could result in burns, eye injury, ignition of equipment, heat stress, etc.				
Cold temperatures that could result in frostbite, lack of coordination, cold stress, etc.				
Types of chemical exposures or contact with chemicals, e.g., potential for splash, contact with skin, eyes, etc.				
Harmful dust or particles.				
Light radiation, e.g., welding, cutting brazing, furnaces, heat treating, high intensity lights, etc.				
Sources of falling objects or potential for dropping objects.				
Sharp objects which might pierce the feet or cut the hands.				
Rolling or pinching objects which could crush the feet.				
Layout of workplace and location of co-workers, i.e., potential for collision with other personnel or objects.				
Electrical hazards.				
Other potential hazards. (please list)				

_____ _____

(Print Name of person who conducted assessment) (Signature)*

_____

(Description of workplace or operation assessed)

*Signature certifies that the workplace hazard assessment has been conducted as required.

APPENDIX B

Employee Training Information

UNIVERSITY OF MICHIGAN-DEARBORN PPE PROGRAM SUPERVISOR'S GUIDE FOR PROVIDING EMPLOYEE TRAINING

General Considerations

The information provided in this document will assist in complying with the training provisions of the MIOSHA Personal Protective Equipment regulations. Prior to conducting work requiring the use of personal protective equipment (PPE), employees must be trained to know:

- when and why PPE is necessary,
- what type is necessary,
- how it is to be worn,
- the limitations,
- proper care, maintenance, useful life and disposal.

Upon completion of the training, the employee must be able to demonstrate the above-mentioned information. Any type of training format can be used as long as a hands-on session is incorporated. Documentation of training is required.

Information is provided for eye and face protection, head, foot and hand protection in this document. Each section can be used as needed and be adapted to individual workplaces after the completion of a Hazard Assessment to select the proper PPE.

Whenever PPE is used, employee comfort should be considered. When PPE does not fit properly, workers will tend not to use it. Follow the manufacturer's recommendations for proper PPE usage.

GOVERNING REGULATION

MIOSHA Personal Protective Equipment Standards for General Industry Part 33 and for Construction Part 6 requires the University to provide their employees with the appropriate personal protective equipment (PPE) in order to perform their job safely. Employees are responsible for wearing the PPE they have been provided and caring for it in accordance with the instructions they have been given. Supervisors are responsible for ensuring that their employees wear their PPE when appropriate.

EYE AND FACE PROTECTION

Selection

National statistics show that three out of five workers who suffered an eye injury were not wearing eye protection. An, out of those who did use eyewear, 40% were wearing the wrong eye protection for the job. It is estimated that more than 1,000 eye injuries occur each day, and over the course of a year, more than 100,000 of these injuries will result in some form of vision loss. The fact is, more than 90% of eye injuries can be prevented with the use of appropriate safety eyewear.

Protection must be utilized where there is potential for injury to the eyes or face from flying particles, molten metal, liquid chemicals, vapors or gases, potentially injurious light radiation or a combination of these. Eye and face protection is available for protection against a variety of hazards. The hazard must be identified prior to selecting the PPE to assure the employee will be properly protected. It is important that eyewear fit securely and be reasonably comfortable for the employee.

Side shields are required when there is an impact hazard from flying objects or a chemical splash hazard present. Safety glasses and goggles can protect against impact hazards. Safety glasses are made of special materials to provide the necessary protection. All eye and face protection must meet the requirements of the ANSI (American National Standards Institute) Standard Z87.1-1989, entitled "American National Standard Practice for Occupational and Educational Eye and Face Protection." Laser eyewear must meet the requirements of ANSI Z136.1, 136.2, and 136.3.

Refer to the Laser Safety Guideline for specific requirements regarding laser safety eyewear.

If safety glasses are to be worn with hearing protection, they must be compatible. If ear muffs are worn, the temple piece of the glasses must not break the seal of the muff. Thin temple piece glasses must be selected to avoid compromising the noise reduction capabilities of the muff.

Prescription safety eyewear is provided to those employees requiring it through EHS and additional information can be found in the Appendix C "Obtaining Prescription Safety Glasses".

Limitations

Safety glasses decrease peripheral vision; they can be uncomfortable; and they can fog, get scratched or dirty and obstruct vision.

Proper Use

Protective eye and facewear should be adjusted to provide maximum protection to the areas being protected. Goggles can be worn over spectacles and can be vented or non-vented. Faceshields are considered a secondary form of protection and must be used in combination with spectacles or goggles to offer the necessary splash protection to the

eye. Contact lens wearers should be aware that dirty and/or chemical environments may present additional hazards. Chemical vapors can penetrate the lens causing damage to the eye. Proper eye protection should always be utilized instead of, or in conjunction with contact lenses.

Inspection and Maintenance

Lenses of eye protectors must be kept clean. Continuous vision through dirty lenses can cause eye strain - often an excuse for not wearing the eye protection. Daily inspection and cleaning of eye protectors with soap and warm water, or with a cleaning solution and tissues, is recommended.

Pitted and scratched lenses can also be a source of reduced vision and compromised protection. Excessively pitted or scratched or otherwise damaged eye and face protection must be replaced.

HEAD PROTECTION

Selection

Head protection must be worn to protect the head from falling objects (impact and penetration), electrical hazards, and bump hazards. Protective headwear must comply with ANSI-Z89.1-1986, entitled "American National Standards for Personal Protection - Protective Headwear for Industrial Workers." Hard hats must be labeled with the ANSI Certification. There are three classes of headwear addressed in the ANSI Standard:

Class A/Class G (General)- will reduce the force of impact/penetration of falling objects and are built to reduce the danger of contact with exposed "low voltage" conductors and these hardhats are proof-tested at 2,200 volts.

Class B/Class E (Electrical) – will also reduce the force of impact/penetration of falling objects and are built to reduce the danger of contact with exposed "high voltage" conductors and these hardhats are proof-tested at 22,000 volts.

Class C (Conductive) – offers the same type of impact and penetration protection (are usually made of aluminum which conducts electricity) and should not be used around electrical hazards.

Proper Use

The shell is the rigid part of the hat and the suspension is the inner portion that cradles the head. The suspension performs two functions. First it orients and keeps the helmet on the head. It is adjustable to maintain a snug and comfortable fit. The second and most important function of the suspension is to absorb and distribute the impact of a falling object. This is the reason for the space between the suspension and the shell.

The suspension system is attached to a headband that is adjustable in 1/8 size increments so the wearer can ensure there is sufficient clearance between the shell and the headband. Hats should be worn according to the manufacturer's instructions and never worn backwards or tilted towards the back of the head.

Accessories are available for head protection such as, hearing protection, faceshields, sweat bands, and winter liners. Always follow the manufacturer's direction for proper usage of accessories.

Inspection and Maintenance

Inspect the shell and the suspension before each use. Look for cracks, chips, dents, or deterioration or any other signs that would indicate the need to replace the shell immediately. Look for cracks, tears or broken straps in the suspension and replace as necessary. Never mix suspensions and shells from different manufacturers.

Never apply paints or solvents to the helmet, it could damage the strength and dielectric properties. Protect from sunlight during storage.
Use warm soap and water to clean the helmet as necessary.

Limitations

Brims that can block vision, can be hot to wear, and deterioration is not always readily visible. Don't store your hard hat in the sun. Light can damage some hard hats.

FOOT PROTECTION

Selection

Foot protection is necessary when hazards exist that could result in impact and compression, electrical, conductive, or injury to any portion of the foot or toes. Any time there is a danger of falling or rolling objects, sharp objects, molten metal, hot surfaces, and foot protection should be worn. Foot protection must comply with the requirements of ANSI Z41-1991, "American National Standard for Personal Protection - Protective Footwear."

When selecting your safety shoes, each staff member should make sure that the shoes fit properly in order to ensure their comfort when wearing. When shoes do not fit properly, workers will tend not to use it. Special consideration should be given to the work environment where the footwear will be worn. Is a special sole necessary? What type chemicals or petroleum products are present? Is radiant heat a problem? Are metatarsal guards necessary?

Consult with the safety shoe vendor for advice on fit and for information concerning specific conditions. For example, if you expect to spend a lot of time outdoors in the winter, the vendor should be able to advise you on shoe styles that will provide the maximum warmth.

Proper Use

Follow the manufacturer's recommendations for proper shoe usage.

Inspection and Maintenance

Keep protective footwear clean and polished, they will last longer. Replace broken or frayed laces. Be attentive to the wear and tear on the entire shoe or boot.

Limitations

The greatest protection of the foot will be the area under the steel insert. Although the toes are most likely to need protection, other parts of the foot could also be impacted by heavy objects of sufficient force.

HAND PROTECTION

Selection

Hand protection is available to protect against cut/punctures, abrasions, thermal burns, vibration, chemical exposures, and electrical shock. There is a wide assortment of gloves available for protection against various hazardous situations. No single glove that will protect from all hazards. Selection of gloves must be based on the hazards that are present, the job task, work conditions, and the duration of use.

Gloves to be used to protect against the effects of chemical use should be selected based on each manufacturer's glove selection charts. To quickly find the appropriate gloves for a particular chemical, go to the following sites and contact the manufacturer for assistance. For online manufacturer information go to:

http://www.microflex.com/Products/~/media/Files/Literature/Microflex%20Chemical%20Resistance%20Guide.ashx
https://www.vwrsp.com/safety/pdf/2003-july_glove_selection.pdf
http://www.showabestglove.com/site/languageselection/?redirectpage=http:$$www.showabestglove.com$site$chemrest$default.aspx
http://www.saftgard.com/
http://www.ansellpro.com/specware/guide.asp
http://www.mapaglove.com/ChemicalSearch.cfm?id=1
http://www.polyco.co.uk/downloads/chemical_resistance_guide.pdf
http://training.mcrsafety.com/permeation/index.shtml

Do not assume that the protection offered by one manufacturer's glove will apply to all types of similar gloves. The protection of each glove is based on the manufacturing processes and glove thickness. Assure that the glove will provide adequate protection for the chemical to be encountered. If multiple chemical hazards exist, base the effectiveness of the glove on the chemical with the fastest breakthrough time.

Proper Use

Gloves should fit properly and provide the degree of dexterity that is needed for the task, especially when working around machinery, where there is the possibility of the glove being caught. Occasionally, people will have skin sensitivity to wearing gloves, especially when wearing latex gloves. You can purchase gloves containing a powder,

which helps to reduce sensitivity and may feel more comfortable. If this does not alleviate the problem, you probably need to try a different type of glove.

When putting gloves on, ensure that there are no tears, holes or split seams. If there is any damage, replace the gloves immediately. While wearing gloves, be aware of the possibility of degradation or permeation. Degradation means the glove is beginning to physically break down and may appear wrinkled, dimpled or cracked. Permeation refers to the ability of the chemical to pass through the glove material. This is more difficult to detect than the previous types of warning signs. This is why it is very important to utilize the glove selection guides that are provided by the manufacturer.

Do not leave the work area with gloves still on, especially when you are wearing gloves for protection from hazardous materials. Do not eat, drink, or smoke while wearing gloves and don't contaminate yourself, or anything outside the work area by keeping your gloves on after your work task is completed.

When gloves are worn to protect from hazardous materials or chemicals, they must be removed properly in order to prevent touching your bare skin with the contaminated glove. Follow these procedures for removal of one-time disposable gloves:

1. Pinch the glove only just below the wrist and pull it off slowly, allowing it to turn inside out as it is pulled off

2. Use the inside of the first glove to grasp the second glove and pull off slowly, allowing the glove to turn inside out as you go.

3. Place the gloves in a sealed container or bag and handle the same as other hazardous waste in your area. Never re-use disposable gloves.

4. Wash your hands after having removed and disposed of the gloves

Inspection & Maintenance

Inspect gloves before and after each use. If gloves are to be reused, follow the manufacturer's instructions for proper decontamination and storage. It is important to note the expected service life of the glove as well, to plan for expected disposal times.

Limitations

No gloves protect you from everything. Use the right gloves for the hazards expected. Gloves can wear out, get torn or damaged. Wearing gloves reduces dexterity, touch, and finger movement.

University of Michigan-Dearborn
Certification of Personal Protective Equipment Training

I_____ certify that the following affected employees
(print full name)
have received and understood personal protective equipment (PPE) training, which included the following: when PPE is necessary; what PPE is necessary; how to properly don, doff, adjust, and wear PPE; the limitations of the PPE; and the proper care, maintenance, useful life and disposal of the PPE. Each of the affected employees has demonstrated an understanding of the above and an ability to use the PPE properly. This training is in compliance with 29 CFR 1910.132 (f).

Employee Name (print)	Employee Signature	Equipment Type	Date of Training

_____ _____
(signature) (date)

Appendix B Note to signer: maintain this certification with your permanent departmental records

Appendix C

Obtaining Prescription Safety Glasses

The Environmental Health and Safety (EHS) has established this prescription safety eyeglass program to assist units in defraying the cost for prescription safety glasses.

Eligibility

EHS will provide American National Standard Institute (ANSI Z87.1) approved protective prescription safety glasses to UM-Dearborn employees.

Procedures for Obtaining Prescription Safety Glasses

The employee or employee's supervisor will contact EHS for prescription safety glass authorization.

A safety glasses order form will be provided to the employee. The employee will take the form to any Fortney Eyecare location. (Locations are listed on the authorization form).

Prescription safety glasses may be replaced every two years **if needed**. Exceptions will be made for changes in prescription, and for broken or damaged frames or lenses. Scratched lenses will be replaced. Broken glasses obtained through this program will be repaired or replaced if the broken pair is returned to the optical shop where issued.

Note: Remakes due to old or erroneous eyeglass prescriptions are not covered by this program.

Reminder: *Prescription safety glasses do not provide adequate splash protection for large amounts of liquids!* In work areas where hazardous biological or chemical materials are used in sufficient quantities to pose a splash hazard, the individual departments must provide chemical splash goggles and/or face shields (available from University M-Marketsite website), and require their use by employees when working with these materials.

Side shields must be worn during all tasks where safety glasses are needed. Side shields are provided on all prescription safety glasses provided through the Campus Safety program.

Non-Prescription Eye Protection

University M-Marketsite website carries a selection of non-prescription eye protection. Departments are encouraged to purchase non-prescription eye protection from the Safety Supply Section of the University M-Marketsite website.

Laser Safety Glasses

This program does not cover laser safety eye protection. These are special application lenses and must be purchased by the department, along with other safety equipment specific to the laboratory.

APPENDIX D

Personal Protective Equipment

A University of Michigan - Dearborn Guide

In order for employees to safely and effectively perform their work provides employees with the necessary personal protective equipment, also known as PPE.

This brochure outlines the department's policies and procedures related to PPE. Related questions or concerns should be directed to your Supervisor or the Environmental Health and Safety (EHS).

HAZARD ASSESSMENTS AND EQUIPMENT SELECTION

A Hazard Assessment is a determination of hazards in the workplace for a particular job classification, such as Maintenance Mechanic. When a hazard cannot be eliminated PPE is often required. The Hazard Assessment also lists the required PPE.

As part of an employee's orientation, Supervisors review the appropriate Hazard Assessment with the employee. Both Supervisor and employee sign the Hazard Assessment and keep a copy of the Hazard Assessment for future departmental records and reference as needed.

SUPERVISOR RESPONSIBILITIES

- Assure that employees have the required PPE, which is provided by The University of Michigan-Dearborn.

- Assure that PPE is kept cleaned and stored in a location that is free from dust, sunlight, chemical exposure and other elements that could compromise the integrity of the PPE.
- Assure that PPE is used as required.
- Assure that employees follow guidelines in this document.
- Serve as the primary contact with EHS related issues.
- Provide PPE training specific to job tasks.

EMPLOYEE RESPONSIBILITIES

- Maintain PPE in a clean condition.
- Store PPE in a location that is free from dust, sunlight, chemical exposure and other elements that could compromise the integrity of the PPE.
- Inspect PPE for wear prior to use. If PPE has been damaged, see your Supervisor for repair or replacement.
- Wear PPE as required.
- Use PPE that is recommended not required, as necessary to protect your health and well-being.

EHS RESPONSIBILITIES

- Provide respirator fit testing and respirators.
- Advise Supervisors on appropriate PPE when requested.
- Provide authorization for prescription safety glasses.

EYE AND FACE PROTECTION

Federal and State laws require appropriate eye or face protection whenever the potential exists for any of the following hazards to exist:

- Flying particles
- Molten metal
- Liquid chemicals
- Corrosive materials
- Air contaminants
- Radiation

All eye and face protection must be in compliance with the American National Standards Institute (ANSI) standard Z87.1-

1989 or Z89.1-2003 (General Industry) and Z87.1-1991 (Construction) and so marked on the PPE.

Safety Glasses
Attached side shields are required on all prescription safety eyeglasses by the State and Federal occupational safety regulations.

Prescription safety glasses can only be obtained with the approval of the EHS. An eye exam, paid for by the employee, is required for prescription safety glasses. Contact the EHS for the appropriate paperwork.

Goggles
Goggles are ***required*** to be worn by staff whenever handling liquids that could injure the eyes or surrounding skin.

Face Shields
Face shields should be worn when the potential exists for chemical splashes or flying particles to come into contact with the face. Safety glasses should be worn beneath face shields.

RESPIRATORY PROTECTION

Respirators are worn on the face to protect the respiratory system from hazardous air contaminants. University Police Department & Environmental Health provides all employee respirators from dust masks to air purifying respirators as well as all replacement cartridges and parts.

Federal law requires that all employees complete a medical questionnaire, fit test & training before receiving any type of respiratory protection. Note that the medical questionnaire may prompt the need for a physical examination. EHS will work with your Supervisor to coordinate these efforts.

Note: To obtain an adequate face seal, Federal law requires that tight fitting respirators cannot be worn with facial hair (anything more than 24 hours growth).

GENERAL APPAREL AND EQUIPMENT

Steel-Toed Shoes

Steel-toed shoes are provided at the department's expense. Check with your supervisor on your department requirements.

Steel-toed shoes are required if job responsibilities pose the potential for crushing injury to the feet.

Boots

Over-the-shoe waterproof rubber boots are provided upon request if job responsibilities require working in areas of excessive water or chemicals, which might damage personal footwear.

Work Gloves

Cotton or leather work gloves are appropriate for most job tasks. Supervisors can use the following sites to identify the proper type of gloves to provide to employees who handle chemicals.

http://www.microflex.com/Products/~/media/Files/Literature/Microflex%20Chemical%20Resistance%20Guide.ashx
https://www.vwrsp.com/safety/pdf/2003-july_glove_selection.pdf
http://www.showabestglove.com/site/languageselection/?redirectpage=http:$$www.showabestglove.com$site$chemrest$default.aspx
http://www.saftgard.com/
http://www.ansellpro.com/specware/guide.asp
http://www.mapaglove.com/ChemicalSearch.cfm?id=1
http://www.polyco.co.uk/downloads/chemical_resistance_guide.pdf
http://training.mcrsafety.com/permeation/index.shtml

Disposable gloves are ***required*** for employees who clean up blood or bodily fluids contaminated with visible blood. Bloodborne Pathogen training and the option of receiving the Hepatitis B vaccination, both provided by the University Police Department & Environmental Health, are required before employees are assigned to cleanup blood or bodily fluids contaminated with blood.

Ear Plugs and Ear Muffs

These are recommended and available when sound levels exceed comfortable noise levels (typically at 85 decibels or greater). The University Police Department & Environmental Health will at the request of an employee's supervisor conducts noise monitoring to

determine which job tasks may expose employees to excessive noise. Employees who
perform tasks where noise may be excessive are in the Hearing Protection Program, which includes regular audiograms to monitor their hearing as well as the ***mandatory*** use of hearing protection during those tasks.

Coveralls and Aprons
Disposable tyvek coveralls are provided upon request when necessary to protect clothing and are required when performing Class II or Class III lead work.

Aprons are provided upon request for employees performing hot work.

Bump Caps
These are provided upon request and are recommended for use when working in pipe chases, tunnels and other areas with low overhead clearance.

Hard Hats
Hard hats must be approved by the American National Standards Institute (ANSI) - see the ANSI designation inside the hat.

Hard hats are used to reduce the possibility of head injury from falling debris and objects and are ***required*** for construction and at other times when the possibility of head injury exists.