Parts 6, 33, and 433 - Personal Protective Equipment Standards for General Industry and Construction

Student Materials

Level Two MTI Course
Consultation Education and Training Division
Michigan Occupational Safety and Health Administration
Michigan Department of Labor and Economic Opportunity
www.michigan.gov/miosha
517-284-7720

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Parts 6, 33, and 433. Personal Protective Equipment Safety and Health Standard for General Industry and Construction

Presented by:

Consultation Education and Training (CET) Division

Michigan Occupational Safety and Health Administration

Michigan Department of Labor AND Economic Opportunity

www.michigan.gov/miosha

517-284-7720

MIOSHA
Michigan Occupational Safety and Health Administration

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Course Objectives

- Differentiate between the MIOSHA construction, general industry and occupational health standards for personal protective equipment (PPE)
- Perform and document a simple PPE hazard survey
- Provide PPE training according to the applicable MIOSHA Standard(s)
- Discuss how to select and use the appropriate PPE in the workplace
- Analyze some hazards found in the workplace

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There are three standards for Personal Protective Equipment:

- General Industry Safety: Part 33
- General Industry Health: Part 433
- Construction Safety: Part 6

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Horizontal vs. Vertical Standards

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Horizontal Standards

Horizontal Standards

- General standards covering all industries and/or equipment where the vertical standard is silent.
- PART 6, PART 33 AND PART 433 ARE HORIZONTAL STANDARDS

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Vertical Standard Examples

Vertical GI Standards

- Industry Specific

Part 11 Polishing, Buffing and Abrading

Part 12 Welding and Cutting

Part 18 Overhead and Gantry Cranes

Part 20 Underhung Cranes and Monorail Systems

Vertical Construction Standards

Part 7 Welding and Cutting

Part 10 Cranes and Derricks

Part 19 Tools

Part 26 Steel Erection

Part 30 Telecommunications

Part 45 Fall Protection

6

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Parts 6, 33, 433 - Scope

These two rules are the same in all three standards:

- Hearing protection shall be in compliance with Occupational Health Standard Part 380 “Occupational Noise Exposure,” as referenced in R408.13301a.
- Respiratory protection shall be in compliance with Occupational Health Standard Part 451 “Respiratory Protection,” as referenced in R408.13301a.

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Part 33 - Scope

This standard shall apply to all places of general industry employment in this state and includes requirements of the employer and use by the employee of personal protective equipment and provides reasonable and adequate means, ways, and methods for the proper selection and safe use of this equipment.

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Part 433 - Scope

General Industry – Occupational Health specifications for and use of personal protective equipment for protection of the employee's:

- Eyes
- Face
- Hands

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Part 433 -Scope (continued)

Must also comply with Part 33 for personal protective safety equipment relating to:

- Eye and face protection
- Head protection
- Hand protection
- Feet protection
- Body protection
- Electrical protective equipment

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Part 6 - Scope
PPE for Construction Activities

PRESCRIBES:

- Use
- Selection
- Maintenance

PROTECTION OF:

- Head
- Face
- Eyes
- Hands
- Feet
- Body

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Part 6 – Scope (Continued)

Protective equipment:
- Eyes and Face
- Head
- Hands and Feet
- Body
- Protective clothing
- Protective shields and barriers

→

Shall be:
- **Provided**
- **Used**
- **Maintained:**
  - Sanitary
  - Reliable

→

When necessary due to hazards:
- Processes
- Environment
- Chemicals
- Radiological
- Mechanical irritants

→

When those hazards are capable of causing injury or impairment through:
- Absorption,
- Inhalation, or
- Physical contact

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Definitions

All three standards have a “Definitions” section. Refer to these for additional clarification when needed.

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Parts 6, 33 and 433
Employer and Employee Responsibilities

An employer shall not permit defective or damaged personal protective equipment to be used.

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Parts 33
Employer and Employee Responsibilities

An employee shall use all the personal protective equipment provided by the employer.

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Part 6
Employer and Employee Responsibilities

- Wear PPE:
  - When required by a MIOSHA Rule
  - All operations where there is an exposure to hazards
- Sanitize PPE between users if contact to skin and used by different people
- PPE of safe design

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Part 6
Hazard Assessment

Formal, written hazard assessment is not required in Part 6.

However, Rule 617 (4) reads:

"An employer shall require the wearing of appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions or where this part indicates the need for using such equipment to reduce the hazards to the employees."

The rule implies that one must do a hazard assessment in order to know where to require PPE.

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Part 6
Hand and Body Protection: Gloves

An employee who handles rough, sharp-edged, abrasive materials, or whose work subjects the hands to any of the following, shall wear hand protection of a type suitable for the work being performed:

(a) Lacerations

(b) Punctures

(c) Burns

(d) Bruises

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Part 6
Hand and Body Protection

- No gloves when operating rotating equipment (e.g. drill)
- Synthetic clothing precautions near flame, spark, hot surfaces
- No loose clothing, neckwear, jewelry near reciprocating or rotating machinery
- No rings unless covered by a glove or tape
- Appropriate head, body and hand protection shall be worn for hazards such as radiation, alkalies, acids, abrasives, temperature extremes

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Part 6
Working Over or Near Water: Life Jackets

Where a possibility of drowning exists, each employee working over or adjacent to water shall wear a life jacket or buoyant work vest

- Must be "U.S. Coast Guard approved."

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Part 6
Working Over or Near Water: Ring Buoys

- A ring buoy with not less than 90 feet of safety line shall be provided and readily available for rescue operations
- The distance between the buoys shall not be more than 200 feet

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Part 6
Working Over or Near Water: Boat

Not less than one lifesaving boat equipped with a method of propulsion that is effective for the water conditions shall be available at the location where an employee works over or adjacent to water.

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Part 6
Laser Protection

- Employees exposed to laser beams shall be furnished suitable laser safety goggles which will protect for the specific wavelength of the laser and be of optical density (O.D.) adequate for the energy involved.
- Table E-2 assists in selecting proper laser safety glasses.
- Output levels falling between lines in this table shall require the higher optical density.

Table E-2 - SELECTING LASER SAFETY GLASS

INTENSITY	ATTENUATION	
CW Maximum Power Density (Watts/CM^2)	**Optical Density (O.D.)**	**Attenuation Factor**
10^{-2}	5	10^5
10^{-1}	6	10^6
1.0	7	10^7
10.0	8	10^8

*10-2 Equals 1 Milliwatt.

Part 6
Laser Protection (continued)

All protective goggles shall bear a label identifying all the following data:

- The laser wavelengths for which use is intended
- The optical density of those wavelengths
- The visible light transmission

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Parts 6 and 33
Electrical Protective Equipment

Electrical requirements shall be all the following:

- Equipment shall be capable of withstanding the alternating current proof-test voltage specified in Table A or the direct current proof-test voltage specified in Table B
- Part 6: These are Tables E-1 and E-2
- The proof test shall reliably indicate that the equipment can withstand the voltage involved

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Parts 6 and 33
Electrical Protective Equipment

Workmanship and finish shall comply with the following:

- Equipment shall be free of physical irregularities that can adversely affect the insulating properties of the equipment and that can be detected by the tests or inspections required by these rules.

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Parts 6 and 33
Electrical Protective Equipment

In-service care and use of electrical protective equipment

- Electrical protective equipment shall be maintained in a safe, reliable condition
- The following requirements apply to rubber insulating blankets, rubber insulating covers, rubber insulating line hose, rubber insulating gloves, and rubber insulating sleeves
- Maximum use voltages shall conform to those listed in Table D (Table E-4 in Part 6)

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Parts 6 and 33
Electrical Protective Equipment

Insulating equipment shall be inspected for damage before each day's use and immediately following any incident that can reasonably be suspected of causing damage. Insulating gloves shall be given an air test, along with the inspection.

Note: ASTM F-1236 "Standard Guide for Visual Inspection of Electrical Protective Rubber Products," 1996 Edition with 2012 supplement, as adopted in R 408.40603, presents methods and techniques for the visual inspection of electrical protective equipment made of rubber. This guide also contains descriptions and photographs of irregularities that can be found in this equipment.

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TABLE D
RUBBER INSULATING EQUIPMENT, VOLTAGE REQUIREMENTS

CLASS OF EQUIPMENT	MAXIMUM USE VOLTAGE[1] ALTERNATING CURRENT RMS	RETEST VOLTAGE[2] ALTERNATING CURRENT RMS	RETEST VOLTAGE[2] DIRECT CURRENT AVG
00	500	2,500	10,000
0	1,000	5,000	20,000
1	7,500	10,000	40,000
2	17,000	20,000	50,000
3	26,500	30,000	60,000
4	36,000	40,000	70,000

[1] The maximum use voltage is the ac voltage (rms) classification of the protective equipment that designates the maximum nominal design voltage of the energized system that may be safely worked. The nominal design voltage is equal to the phase-to-phase voltage on multiphase circuits. However, the phase-to-ground potential is considered to be the nominal design voltage if either of the following occur:

(1) There is no multiphase exposure in a system area and the voltage exposure is limited to the phase-to-ground potential.

(2) The electric equipment and devices are insulated or isolated or both so that the multiphase exposure on a grounded wye circuit is removed.

[2] The proof-test voltage shall be applied continuously for at least 1 minute, but no more than 3 minutes.

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Parts 6 and 33
Electrical Protective Equipment

Insulating equipment with any of the following defects shall not be used

- A hole, tear, puncture, or cut.
- Ozone cutting or ozone checking, that is a series of interlacing cracks produced by ozone on rubber under mechanical stress.
- An embedded foreign object.
- Any of the following texture changes:

(i) Swelling
(ii) Softening
(iii) Hardening
(iv) Becoming sticky or inelastic.
(v) Any other defect that damages the insulating properties

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Parts 6 and 33
Electrical Protective Equipment

Insulating equipment shall be stored in a location and in a manner as to protect it from all of the following:

- Light
- Temperature extremes
- Excessive humidity
- Ozone
- Other damaging substances and conditions

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Parts 6 and 33
Electrical Protective Equipment

Protector gloves shall be worn over insulating gloves, except under the following conditions:

- Protector gloves need not be used with class 0 gloves, under limited-use conditions, when small equipment and parts manipulation necessitate unusually high finger dexterity.

Note: Persons inspecting rubber insulating gloves used under these conditions shall take extra care in visually examining them. Employees using rubber insulating gloves under these conditions shall take extra care to avoid handling sharp objects.

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Parts 6 and 33
Electrical Protective Equipment

Insulating gloves that have been used without protector gloves shall not be reused until they have been tested

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TABLE E RUBBER INSULATING EQUIPMENT TEST INTERVALS	
TYPE OF EQUIPMENT	**WHEN TO TEST**
Rubber insulating line hose	Upon indication that insulating value is suspect and after repair.
Rubber insulating covers	Upon indication that insulating value is suspect and after repair.
Rubber insulating blankets	Before first issue and every 12 months thereafter;[1] upon indication that insulating value is suspect; and after repair
Rubber insulating gloves	Before first issue and every 6 months thereafter;[1] upon indication that insulating value is suspect; after repair; and after use without protectors
Rubber insulating sleeves	Before first issue and every 12 months thereafter;[1] upon indication that insulating value is suspect; and after repair
[1] If the insulating equipment has been electrically tested but not issued for service, the insulating equipment shall not be placed into service unless it has been electrically tested within the previous 12 months.	

Parts 6 and 33 Electrical Protective Equipment

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Parts 6 and 33 Electrical Protective Equipment

The employer shall certify that equipment has been tested pursuant to the requirements of this rule. The certification shall identify the equipment that passed the test and the date it was tested and shall be made available upon request to the department of licensing and regulatory affairs director and to MIOSHA employees or their authorized representatives.

Note: Marking equipment with, and entering onto logs, the results of the tests and the dates of testing are acceptable means of meeting the certification requirement.

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NFPA 70E Arc Flash PPE Hazard/Risk Categories

Hazard/Risk Category 4 cal/cm² **1**	Arc-rated long-sleeve shirt Arc-rated pants or overall Arc-rated face shield with hard hat Safety glasses Hearing protection Leather & voltage rated gloves (as needed) Leather work shoes	
Hazard/Risk Category 8 cal/cm² **2**	Arc-rated long-sleeve shirt Arc-rated pants or overall Arc-rated face shield & balaclava or Arc flash suit with hard hat Safety glasses, Hearing protection Leather & voltage rated gloves (as needed) Leather work shoes	
Hazard/Risk Category 25 cal/cm² **3**	Arc-rated long-sleeve jacket Arc-rated pants Arc-rated flash hood with hard hat Safety glasses, Hearing protection Leather & voltage rated gloves (as needed) Leather work shoes	
Hazard/Risk Category 40 cal/cm² **4**	Arc-rated long-sleeve jacket Arc-rated pants Arc-rated flash hood with hard hat Safety glasses, Hearing protection Leather & voltage rated gloves (as needed) Leather work shoes	

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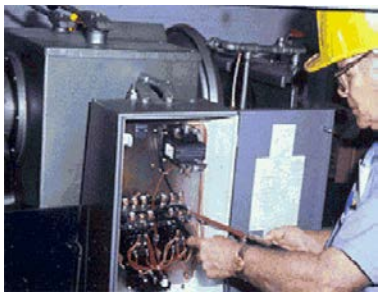
Parts 6 and 33 Additional requirements

Electrical Protective Equipment Rule 3387a

- An insulated blanket, glove, or sleeve shall be capable of withstanding the voltage to which it may be subjected.
- An employee shall use insulating gloves and sleeves capable of withstanding the imposed voltage.



MTI 2-Day Course for Part 17, 39 and 40

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Part 33
Use of Head Protection

An employer shall ensure that each affected employee is provided with, and wears, head protection equipment and accessories when the employee is required to be present in areas where a hazard or risk of injury exists from any of the following:

- Falling or flying objects. (Parts 33 and 6)
- Other harmful contacts or exposures. (Parts 33 and 6)

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Part 6
Use of Head Protection

Employees working in areas where there is a possible danger of head injury from impact, or from falling or flying objects, or from electrical shock and burns, shall be protected by protective helmets.

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Parts 6 and 33
Use of Head Protection

Where there is a risk of injury from any of the following:

- Electric shock (Parts 6 and 33)
- Hair entanglement (Part 33)
- Chemicals (Part 33)
- Temperature extremes (Part 33)

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Part 33
Hair Entanglement

A hat, cap, or net shall be worn by a person where there is a danger of hair entanglement in moving machinery or equipment, or where there is exposure to means of ignition.

April 7, 2017, an employee was using a Metabo Portable Grinder to remove the paint from the shields. This is a normal task that the squires perform at least once a week or when there aren't many shows. He remembered that he was performing the task of removing the paint from the shields, and the next thing he remembers is being in the ambulance. According to the police report, his hair, which was below his shoulders, became tangled in the tool. The grinder pulled enough tension to split the skin on his scalp. A coworker summoned emergency medical personnel and the employee was transported to the medical center's shock trauma. The employee received a depressed skull fracture, which required stitches and 18 staples.

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Parts 6 and 33
Use of Head Protection (continued)

Head protection equipment that has been physically altered, painted, or damaged shall not be worn

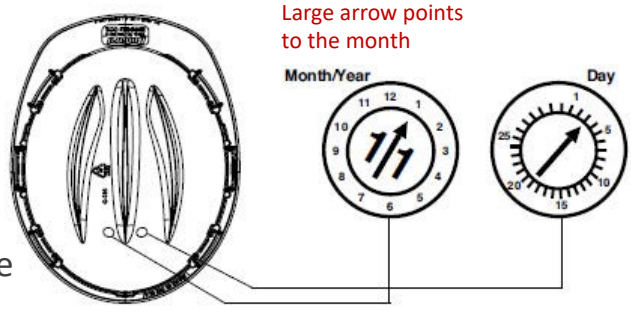
Conditions that can degrade a hardhat over time:

- Sunlight (UV)
- High Temperature
- Chemicals (e.g. contact with paint and solvents)

Parts 6 and 33
Use of Head Protection

Checking the date on a hard hat – Example

This example shows a cap that was molded on January 3, 2011.



This manufacturer's warranty expires after two years.

Check with specific manufacturer for service life and rating specifications.

Part 6 and 33 Use of Head Protection: Class Activity

Groups of four - five participants.

Inspect and evaluate hard hats.

Look for deficiencies in integrity, assembly and end of useful life based on manufacture date of the hat.

Assume a useful life of five years.

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Part 33 Multi-use of PPE by more than one employee

Rule 3313 Face and Head: ”Cleaned, sanitized and in good condition”

Rule 3378 Hair Enclosure: “been thoroughly sanitized”

Rule 3385 Foot Protection: “cleaned, and sanitized inside and out”

Rule 3393 Hand protection: “gloves shall be sanitized before reissuance”

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Multi-use Gloves of a Glovebox

Sanitize glovebox gloves between users **or**

Provide disposable gloves to be worn inside as protective double glove - ensure no skin contact

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Part 433
Employer's and Employee's Responsibilities

Where employees provide their own protective equipment, an employer shall be responsible for:

- Ensuring the adequacy of the equipment
- Proper maintenance of the equipment
- Sanitation of the equipment

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Parts 6, 33, and 433
Payment for PPE

An employer shall provide at no cost to employees the personal protective equipment necessary to protect against hazards that the employer is aware of as a result of any required assessments.

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Parts 6, 33, and 433
Payment for PPE (continued)

Employer shall pay to replace:

- When the PPE no longer provides the protection it was designed to provide
- When the previously provided PPE is no longer adequate or functional

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Parts 6, 33, and 433
Payment for PPE (continued)

Employer NOT required to pay for replacement PPE if:

- Lost or intentionally damaged
- Prescription safety eyewear
- Everyday clothing including weather protection
- Upgraded and personalized PPE

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Parts 6 and 33
Payment for PPE

Foot Protection:

- Not required to pay for non-specialty safety-toe protective footwear
- Provide metatarsal guards

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Parts 33 and 433
Hazard Assessment

Assess the workplace:

- Hazards present or likely present
- Cannot eliminate by feasible engineering controls (Part 33 only)
- Select/ensure use of appropriate PPE to protect
- Verify hazard assessment has been performed

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Part 33 and 433
Written Certification

Employer must verify through written certification:

- The workplace evaluated
- The person certifying that the evaluation has been performed
- Date or dates of the PPE hazard assessment

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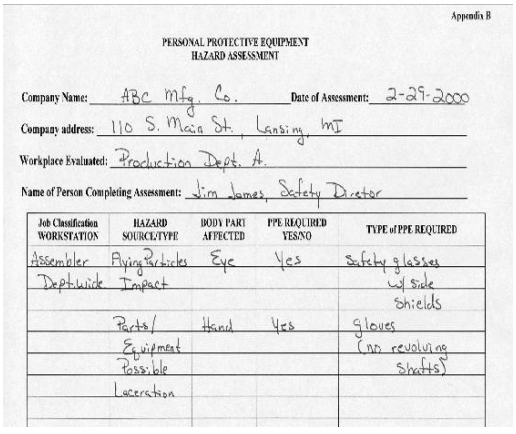
Frequently Cited PPE Rules

- Failure to perform Hazard Assessment (no certification)
- Failure to provide the appropriate type(s) PPE
- Failure to ensure use of PPE
- Failure to ensure proper maintenance and sanitation

Performing the Hazard Assessment
Sample PPE Hazard Assessment Tool



Appendix B

PERSONAL PROTECTIVE EQUIPMENT
HAZARD ASSESSMENT

Company Name: ABC Mfg. Co. Date of Assessment: 2-29-2000

Company address: 110 S. Main St., Lansing, MI

Workplace Evaluated: Production Dept. A.

Name of Person Completing Assessment: Jim James, Safety Director

Job Classification WORKSTATION	HAZARD SOURCE/TYPE	BODY PART AFFECTED	PPE REQUIRED YES/NO	TYPE of PPE REQUIRED
Assembler	Flying Particles	Eye	Yes	Safety glasses
Dept.wide	Impact			w/ side shields
	Parts/ Equipment	Hand	Yes	gloves (no revolving shafts)
	Possible Laceration			

Sample Hazard Assessment Tool

PPE
HAZARD ASSESSMENT

Company Name: _____ **Date of Assessment:** _____

Company Address: _____

Workplace Evaluated: _____

Name of Person Completing Assessment: _____

Job Classification WORKSTATION	HAZARD SOURCE/TYPE	BODY PART AFFECTED	PPE REQUIRED YES/NO	TYPE of PPE REQUIRED

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Sample Hazard Assessment Tool

Sample PPE Walk Through Survey and Certification

Department _____ **Task** _____ **Date** _____

Assess each task for hazards using the following criteria: (1) ***Type of injury or illness possible*****: (2)** ***Probability*** **– unlikely, likely, highly likely; and (3) Severity – death, serious injury/illness, not serious injury/illness.**

1. ***Sources of motion*** **– machinery, processes, tools, materials, people, etc.** _____
Required PPE:

2. ***Sources of high temperatures*** **– that could cause burns, ignition, injury to eyes, etc.** _____
Required PPE: _____

3. ***Sources of chemical exposure*** **– splash, vapor, spray, immersion, etc.** _____
Required PPE: _____

4. ***Sources of harmful atmospheres*** **– dust, fumes, gasses, mists, vapors, fibers, etc.** _____
Required PPE: _____

5. ***Sources of light radiation*** **– welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.**
Required PPE:

6. ***Sources of falling objects*** **– materials, equipment, tools, etc.**
Required PPE:

7. ***Sources of sharp objects*** **– which could pierce the skin – feet, hands, face, etc.**
Required PPE:

8. ***Sources of rolling or pinching that could crush*** **– hands, feet.**
Required PPE: _____

9. ***Layout of workplace and location of co-workers*** **– adequate space for task.** _____
Required PPE: _____

10. ***Sources of contact with electricity*** **– wires, grounding.** _____
Required PPE: _____

I certify that I have conducted a workplace survey on the above task to assess the need for PPE. The PPE noted above will be required while performing this task.

_____ Signature _____ Date

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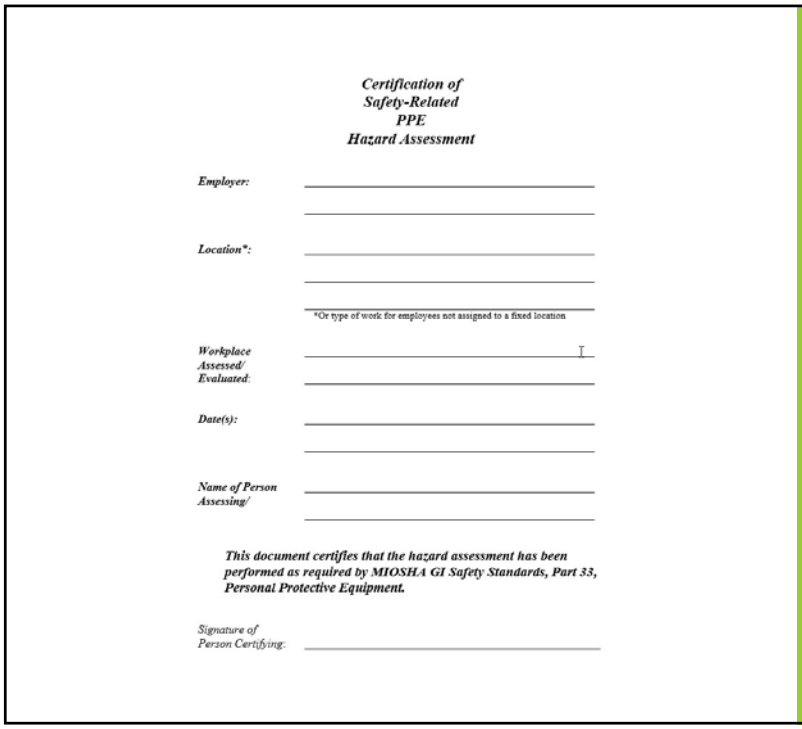

Certification of
Safety-Related
PPE
Hazard Assessment

Employer: _____

_____

Location:* _____

_____

_____

*Or type of work for employees not assigned to a fixed location

Workplace Assessed/ Evaluated: _____

_____

Date(s): _____

_____

Name of Person Assessing/ _____

_____

This document certifies that the hazard assessment has been performed as required by MIOSHA GI Safety Standards, Part 33, Personal Protective Equipment.

Signature of Person Certifying: _____

Sample Written Certification

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Parts 33 and 433 Hazard Assessment

What jobs are employees doing? What hazards are associated with those jobs and how do you protect exposed employees?

- Walk through work areas
- Talk with employees
- SDS's

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Perform a Hazard Assessment

Use work descriptions, SDSs and Hazard Assessment Form provided to assess the personal protective equipment needed for each task:

- Use of gasoline powered chainsaw
- Concrete cutting on a construction site
- Grinding metal part

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Use of gasoline powered chainsaw

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Concrete Cutting on Construction Site

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Grinding Metal Part

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Sources of Impact and Motion

- Struck by/on hazards
- Moving tools and machine elements
- Bump hazards
- Falling objects
- Flying objects/ particulates
- Chemical splashes

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Sources of Temperature Extremes

- Addresses hot and cold temperatures
- Burns, eye injuries, ignition of protective equipment and/or clothing, and frostbite
- Molten metal, cold/hot objects, work in temperature extremes, etc.

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Chemical Exposure Sources

- Gases, Vapors
- Particulates:
  - Fibers
  - Dusts
  - Mists
  - Fumes
  - Smoke
- Inhalation
- Skin absorption

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Sources of Hazardous Radiation

Light radiation from welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.

Other radiation sources

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Sources of Falling or Dropping Objects

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Sources of Sharp Objects

Objects which might cut, slash, or pierce

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Sources of Rolling or Pinching Hazards

Crushing or compression hazards

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Parts 33 and 433 Training

Provide training to each employee required to use PPE:

- When PPE is necessary
- What PPE is necessary
- How to properly don, doff, adjust, and wear the personal protective equipment...

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Parts 33 and 433 Training

Provide training to each employee required to use PPE (continued):

- Limitations of the equipment
- Useful life of the equipment
- Proper care, maintenance, and disposal of the equipment

No requirements in Construction Part 6

- This is covered in Construction Part 1

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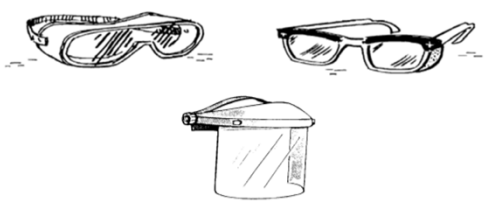
Parts 33 and 433 Training

Each affected employee shall demonstrate:

- An understanding of the training
- The ability to use the equipment properly prior to performing work requiring the use of PPE



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Removing Contaminated Gloves

1. Grasp glove at the wrist and pull inside out
2. Hold soiled glove in gloved hand
3. Slide fingers under second glove and pull inside out over soiled glove
4. Dispose

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Resources for Selection and Training

NIOSH:

- Chemical Protective Clothing Database

YouTube:

- Why do we wear PPE (Demo of Effectiveness)

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Parts 33 and 433
Re-training

The employer shall retrain the employee when there is reason to believe that any affected employee who has already been trained does not have the understanding and skill required to use PPE

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Parts 33 and 433
Re-training (continued)

Retraining required if:

- Changes in the workplace
- Changes in the types of personal protective equipment
- Employee inadequacies in knowledge or use of assigned personal protective equipment

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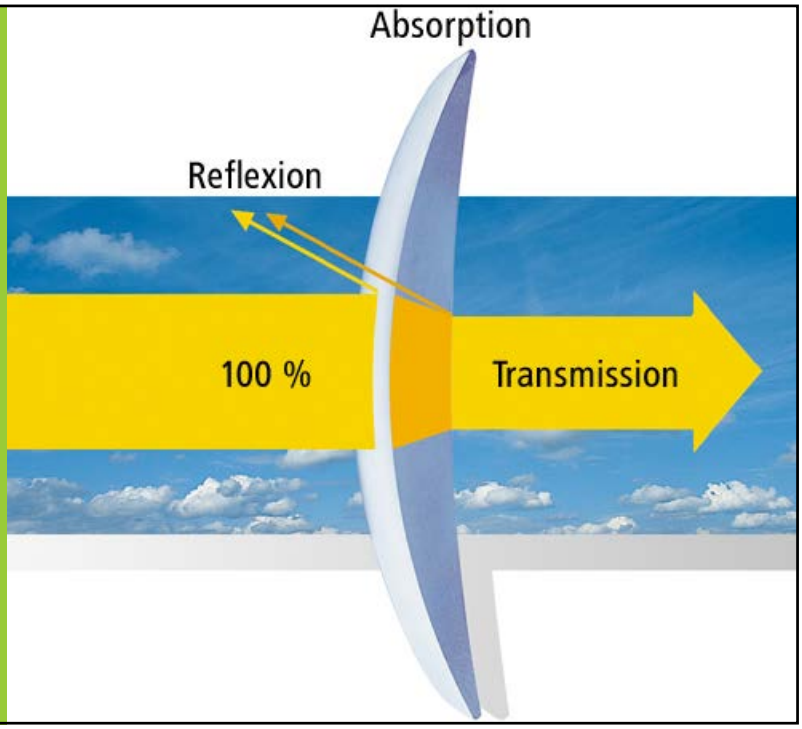
Definitions:

"Absorptive lens" means a filter lens whose physical properties are designed to attenuate the effect of glare, reflective, and stray light.



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"Filter lens" means a lens that attenuates specific wavelengths of ultraviolet, visible, and infrared radiation according to the composition and density of the lens.

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Parts 6, 33, and 433
When Face and Eye Protection is Required

- Flying objects or particles
- Molten metal
- Liquid chemicals
- Acids or caustic liquids
- Injurious radiation
- Radiation
- A combination of these hazards
- Chemical fumes, gases or vapors

Part 33 Only:

- Harmful contacts
- Glare
- Electrical flash
- Exposures

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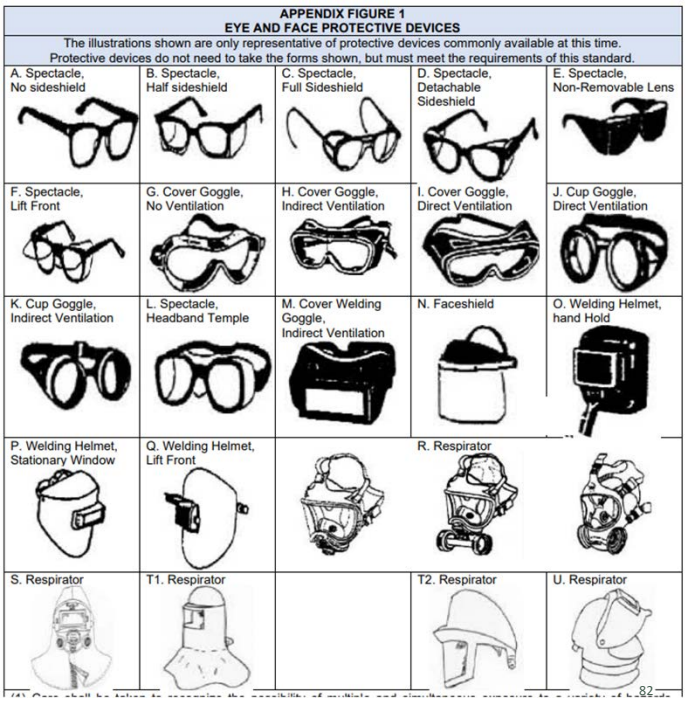
Part 33 When Face and Eye Protection is Required

Figure 1 is a non-mandatory appendix.



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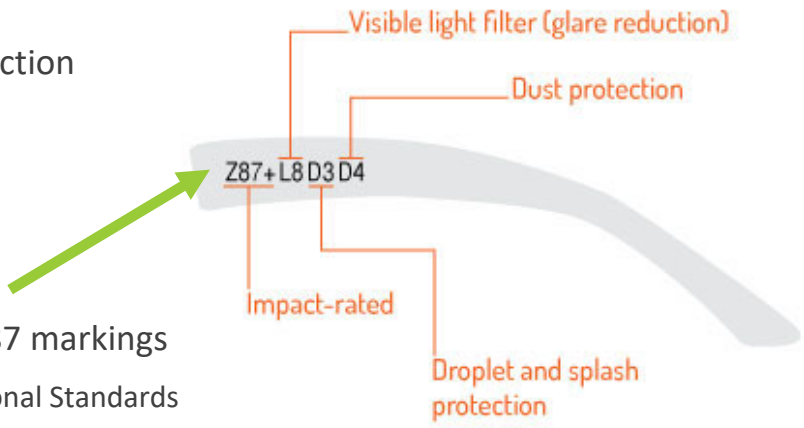
Parts 6, 33, and 433
Face and Eye Protection (continued)

Distinctly marked

Provides side protection



Example of ANSI Z87 markings

ANSI = American National Standards

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Parts 6 and 33
Face and Eye Protection (continued)

A protector shall be in compliance with all of the following minimum requirements:

- Provides adequate protection
- Fits snugly, does not interfere
- Withstanding sanitizing
- Limitations

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Parts 6 and 433
Contact and Prescription Lenses

Contact Lenses Are Not Eye Protection!

Employees that are exposed to eye hazards and wear prescription lenses must:

- Wear eye protection that incorporates the prescription in its design, OR
- Wear eye protection that can be worn over the prescription lenses

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Part 33
Maintenance and Cleanliness of Protectors

- Kept clean and in good repair
- Replace slack, worn out, sweat-soaked, knotted, or twisted headbands
- Prior to reissuing, multi-user face or eye protectors must be:
  - Cleaned,
  - Sanitized, and
  - In good condition

86

86

Part 33 - Lenses

Four basic types of impact-resistant eye protector lenses:

- Clear lenses – flying objects
- Absorptive lenses of shades (1.7 through 3.0)
  - Flying objects and
  - Glare
  - Narrowband spectral transmittance of injurious radiation
- Protective-corrective lenses
- Filter lenses
  - Flying objects
  - Narrow-band spectral transmittance of injurious radiation

87

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88

88

Parts 33 and 433 Filtered Lenses

An employer shall ensure that each affected employee uses equipment that has filter lenses which have shade numbers appropriate for the work being performed for protection from injurious light radiation.

(2) Table 1 is a listing of appropriate shade numbers for various operations.

89

89

Parts 33 and 433 Filtered Lenses Table 1

TABLE 1
FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

OPERATIONS	PLATE THICKNESS (INCHES)	PLATE THICKNESS (MM)	MINIMUM* PROTECTIVE SHADE
Gas Welding: Light Medium Heavy	 Under 1/8 1/8 to 1/2 Over 1/2	 Under 3.2 3.2 to 12.7 Over 12.7	 4 5 6
Oxygen Cutting Light Medium Heavy	 Under 1 1 to 6 Over 6	 Under 25 25 to 150 Over 150	 3 4 5
OPERATIONS	**ELECTRODE SIZE 1/32 IN.**	**ARC CURRENT**	**MINIMUM* PROTECTIVE SHADE**
Shield metal Arc welding	Less than 3 3 to 5 more than 5 to 8 more than 8	Less than 60 60 to 160 161 to 250 251 to 550	7 8 10 11
Gas metal arc welding and flux	cored arc welding	Less than 60 60 to 160 161 to 250 251 to 500	7 10 10 10
Gas tungsten arc	welding	Less than 50 50 to 150 151 to 500	8 8 10
Air carbon Arc cutting	(Light) (Heavy)	Less than 500 500 to 1000	10 11
Plasma arc welding		Less than 20 20 to 100 101 to 400 401 to 800	6 8 10 11
Plasma arc cutting	(Light)** (Medium)** (Heavy)**	Less than 300 300 to 400 401 to 800	8 9 10
Torch brazing Torch soldering Carbon arc welding			3 2 14

* As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade that gives a 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 light filters may be used when the arc is hidden by the workpiece.

90

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Part 6
Filtered Lenses

Selection of shade numbers for welding filter. Table E-1 shall be used as a guide for the selection of the proper shade numbers of filter lenses or plates used in welding. Shades more dense than those listed may be used to suit the individual's needs.

91

Part 6
Filtered Lenses
Table E-1

TABLE E-1	
FILTER LENS SHADE NUMBERS FOR PROTECTION AGAINST RADIANT ENERGY	
WELDING OPERATION	SHADE NUMBER
Shielded metal-arc welding 1/16-, 3/32-, 1/8-, 5/32-, inch diameter electrodes	10
Gas-shielded arc welding (nonferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	11
Gas-shielded arc welding (ferrous) 1/16, 3/32-, 1/8-, 5/32-inch diameter electrodes	12
Shielded metal-arc welding 3/16-, 7/32-, 1/4-inch diameter electrodes	12
5/16-, 3/8-inch diameter electrodes	14
Atomic hydrogen welding	10 - 14
Carbon-arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, over 6 inches	5 or 6
Gas welding (light), up to 1/8-inch	4 or 5
Gas welding (medium), 1/8-inch to 1/2-inch	5 or 6
Gas welding (heavy), over 1/2-inch	6 or 8

92

Part 33 Welding Helmets and Hand Shields Purpose, Types, and Marking

- Protection of the face, eyes, ears, and neck against intense radiant energy and spatter
- A helmet and a hand shield are the only permissible types of eye and face protection for welding
- Must bear a permanent and legible marking to identify the manufacturer

93

Part 33 Welding Helmets and Hand Shields

- Rigid helmet bodies
- Rigid helmet headgear or cradles
- Rigid helmet headgear substitutes
- Rigid helmet filter plates
- Non-rigid helmets
- Hand shield
- Helmet and hand shield lift fronts and chin rests
- Helmet snoods, neck protectors, and aprons

94

DEFINITIONS

"Hood" Means a device that is worn to provide protection against acids, chemicals, abrasives, and temperature extremes and entirely encloses the whole head including face, neck, and shoulders. Air-line hoods and hoods used to protect wearers from inhalation or harmful atmospheres are not included in this part.

95

95

"Face shield" means a device worn in front of the eyes and a portion or all of the face, whose predominant function is protection of the eyes and face.

96

96

"Hand shield" means a hand-held welding helmet. See "welding helmet".

97

97

"Welding helmet" means a protective device intended to provide protection for the eyes and face against optical radiation and weld spatter, which shall be worn only in conjunction with spectacles or goggles.

98

98

"Snood" means a flexible attachment to the back of a hood or helmet for protection against injury to the back of the head and neck.

99

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Part 33
Face Shields

Protect the front part of the head (forehead to neck) from:

- Flying particles
- Sprays of hazardous liquids
- Harmful light radiation

➢ **Must be worn over appropriate eye protection**

100

100

"Face shield" means a device worn in front of the eyes and a portion or all of the face, whose predominant function is protection of the eyes and face.

101

101

Part 33
Face Shields continued

Typical uses:

- Woodworking operations
- Metal machining operations
- Buffing, polishing, wire brushing, and grinding operations
- Spot welding
- Handling hot or corrosive materials

102

102

What if..

Sewing Machine Operator Eye Protection

When reviewing sewing machine operations:

- Frontal protection MAY be all that is needed
- If there are more than one machine and operators are not isolated from each other BOTH frontal and side protection IS required.

Parts 33 and 433 Hand Protection

An employer shall select and require employees to use appropriate hand protection when employees' hands are exposed to hazards, such as those from any of the following:

(a) Skin absorption of harmful substances
(b) Severe cuts or lacerations
(c) Severe abrasions
(d) Punctures
(e) Chemical burns
(f) Thermal burns
(g) Harmful temperature extremes

105

Parts 33 and 433 Hand Protection - Selection

An employer shall base the selection on the following:

- The task or tasks to be performed.
- Conditions present.
- Duration of use.
- The hazards and potential hazards identified.

Hand protection interiors shall be kept free of corrosive or irritating contaminants.

If more than one employee wears a pair of gloves, the gloves shall be sanitized before re-issuance.

106

Glove Ratings and Chemical Compatibility

- Degradation
- Breakthrough time
- Permeation rate

All three should be evaluated as part of the selection process.

107

Degradation

Change in physical properties of the glove material:

- Swelling
- Wrinkling
- Stiffness
- Change in color
- Other physical deterioration

108

Breakthrough time

Elapsed time between initial contact of the chemical on one side of the glove material and detection of the chemical on the other side of the glove material.

Test is conducted per the ASTM F739 Standard.

109

Permeation rate

Rate of the chemical passing through the glove material at the molecular level.

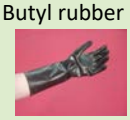
Example: balloon loses air over time even though it is still tied and has no visible holes.

Thickness of glove affects permeation.

This test is also conducted per ASTM F739.

110

Gloves Types and Application

Glove Material	Intended Use	Advantages and disadvantages
Butyl rubber 	Extended contact	• Good for ketones and esters • Poor for gasoline and aliphatic, aromatic, and halogenated hydrocarbons
Neoprene 	Extended contact	• Good for acids, bases, alcohols, fuels, peroxides, hydrocarbons, and phenols • Good for most hazardous chemicals • Poor for halogenated and aromatic hydrocarbons
Norfoil or Silver Shield 	Extended contact	• Good for most hazardous chemicals • Poor fit (Note: Dexterity can be partially regained by using a heavier weight Nitrile glove over the Norfoil/Silver Shield glove.

Source: UC Berkley, Environmental Safety and Health, Glove Selection Chart

Gloves Types and Application

Glove Material	Intended Use	Advantages and disadvantages
Polyvinyl chloride (PVC) 	Specific use	• Good for acids, bases, oils, fats, peroxides, and amines • Good resistance to abrasions • Poor for most organic solvents
Polyvinyl alcohol (PVA) 	Specific use	• Good for aromatic and chlorinated solvents • Poor for water-based solutions

Source: UC Berkley, Environmental Safety and Health, Glove Selection Chart

Gloves Types and Application

Glove Material	Intended Use	Advantages and disadvantages
Stainless steel  Kevlar  Leather 	Specific use	• Cut-resistant gloves • Sleeves are also available to provide protection to wrists and forearms Note: If potential for biological or chemical contamination: wear appropriate disposable gloves on top of your cut-resistant gloves and discard after use

Source: UC Berkley, Environmental Safety and Health, Glove Selection Chart

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113

Glove Selection Activity

Use the glove chart provided to evaluate gloves for the following chemicals:

Acetone	**Hydrogen Peroxide**
Dimethyl Sulfoxide (DMSO)	**Isopropyl Alcohol**
Formaldehyde	**Methylene Chloride**
Glutaraldehyde 25%	**Methyl Ethyl Ketone**

114

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Selection of PPE - Assistance

- Review selection charts and guides from manufacturers
- Contact your supplier/manufacturer of PPE for assistance in selecting the proper PPE based on exposure
- Consult consensus standards (i.e. ANSI, ASTM) especially when referenced in MIOSHA Standards

ANSI = American National Standards Institute
ASTM = American Society for Testing and Materials

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Part 33
Body Protection

An employer shall ensure that each employee who is required to work so that his or her clothing becomes wet due to a condition other than the weather or perspiration uses any of the following:

- Aprons
- Coats
- Jackets
- Sleeves
- Other garments that will keep his or her clothing dry

116

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Part 33
Body Protection (continued)

The material shall be unaffected by the wetting agent.

The provision of dry, clean, acid-resistant clothing, in addition to rubber shoes or short boots and an apron, shall be considered a satisfactory substitute where small parts are cleaned, plated, or acid-dipped in an open tank.

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Foot and Toe Protection

119

Parts 6 and 33
Foot Protection

If 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, then the employer shall provide any of the following to the employee:

- Boots
- Overshoes
- Rubbers
- Wooden-soled shoes
- The equivalent to subdivisions (a) to (d) of this sub-rule

Photo-Chicago Protective Apparel

120

Part 33
Foot and Toe Protection

An employer shall ensure that each affected employee shall wear protective footwear when working in areas where any of the following occur:

(a) When the use of protective footwear will protect the affected employee from an **electrical hazard**, such as a static-discharge or electric-shock hazard, that remains after the employer takes other necessary protective measures.

121

Part 33
Foot and Toe Protection

(b) There is a danger of foot injuries due **to falling or rolling objects**.

(c) There is a danger of **objects piercing** the sole of the shoe.

122

Example of Head to Toe Protection

123

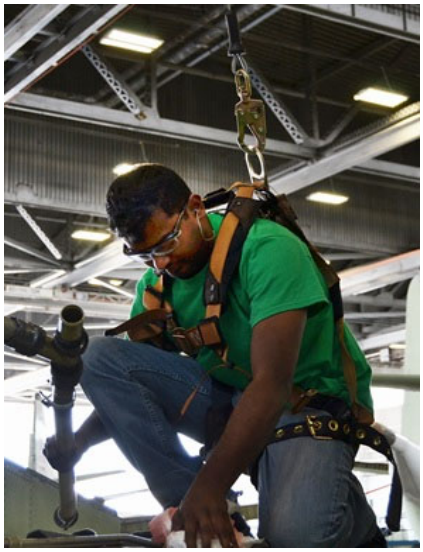
123

The Primary Levels of Head to Toe Protection

124

124

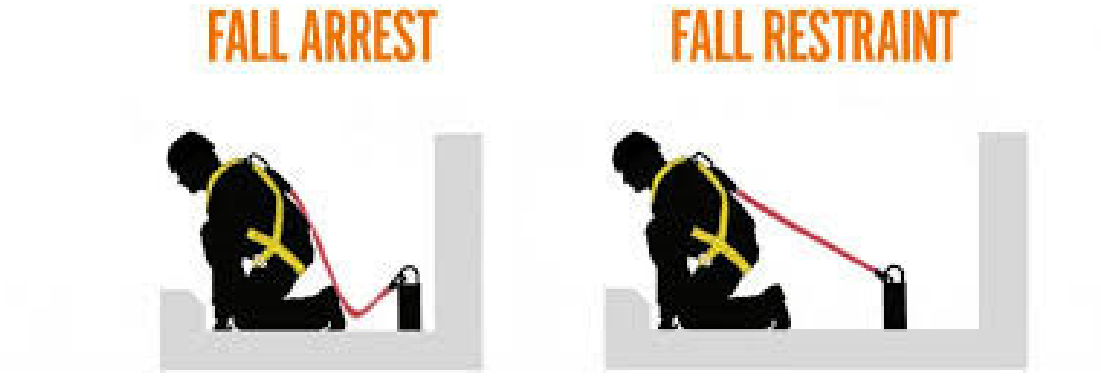
Part 33
Fall Protection



Part 33
Fall Protection (Scope)

This standard establishes performance, care, and use criteria for all personal fall protection systems.

An employer shall ensure that each personal fall protection system used to comply with these rules shall meet the requirements of these rules.



Fall Arrest vs. Fall Restraint

127

Definitions

"Anchorage" means a secure point of attachment for equipment such as lifelines, lanyards, or deceleration devices.

"Body belt" means a strap with means both for securing about the waist and for attaching to other components such as a lanyard used with positioning systems, travel restraint systems, or ladder safety systems.

"Body harness" means straps that secure about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders, with a means for attaching the harness to other components of a personal fall protection system.

128

Definitions

"Carabiner" means a connector generally comprised of a trapezoidal or oval shaped body with a closed gate or similar arrangement that may be opened to attach another object and, when released, automatically closes to retain the object.

"Competent person" means a person who is capable of identifying existing and predictable hazards in any personal fall protection system or any component of it, as well as in their application and uses with related equipment, and who has authorization to take prompt, corrective action to eliminate the identified hazards.

129

Definitions

"Qualified" means a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.

Note: Training fir fall protection may only be provided by a qualified person.

130

Definitions

"Anchorage" means a secure point of attachment for equipment such as lifelines, lanyards, or deceleration devices.

131

131

"Body belt" means a strap with means both for securing about the waist and for attaching to other components such as a lanyard used with positioning systems, travel restraint systems, or ladder safety systems.

132

132

"Body harness" means straps that secure about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders, with a means for attaching the harness to other components of a personal fall protection system.

133

133

"Carabiner" means a connector generally comprised of a trapezoidal or oval shaped body with a closed gate or similar arrangement that may be opened to attach another object and, when released, automatically closes to retain the object.

134

134

"Competent person" means a person who is capable of identifying existing and predictable hazards in any personal fall protection system or any component of it, as well as in their application and uses with related equipment, and who has authorization to take prompt, corrective action to eliminate the identified hazards.

135

Definitions

"Connector" means a device used to couple or connect parts of the fall protection system together.

"Deceleration device" means any mechanism that serves to dissipate energy during a fall.

"Equivalent" means alternative designs, equipment, materials, or methods that the employer can demonstrate will provide an equal or greater degree of safety for employees compared to the designs, equipment, materials, or methods specified in the standard.

136

Definitions

"Positioning system," also known as work-positioning system, means a system of equipment and connectors that, when used with a body harness or body belt, allows an employee to be supported on an elevated vertical surface, such as a wall or windowsill, and work with both hands free. Positioning systems are also known as "positioning system devices" and "work-positioning equipment."

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137

"Self-retracting lifeline or lanyard" means a deceleration device containing a drum-wound line that can be slowly extracted from, or retracted onto, the drum under slight tension during normal movement by the employee. At the onset of a fall, the device automatically locks the drum and arrests the fall.

138

138

"Travel restraint system" means a combination of an anchorage, anchorage connector, lanyard or other means of connection, and body support that an employer uses to eliminate the possibility of an employee going over the edge of a walking-working surface.

139

Part 33
Personal Fall Protection Systems

- 408.13395a(1) An employer shall ensure that personal fall protection systems meet the requirements contained in this standard.

- 408.13395a(7) A competent person or qualified person shall inspect each knot in a lanyard or vertical lifeline to ensure that it meets the requirements of subrules (5) and (6) of this rule, before any employee uses the lanyard or lifeline.

140

Part 33
Personal Fall Protection System Means

"Personal fall protection system" means a system, including all components, an employer uses to provide protection from falling or to safely arrest an employee's fall if one occurs. Examples of personal fall protection systems include personal fall arrest systems, positioning systems, and travel restraint systems.

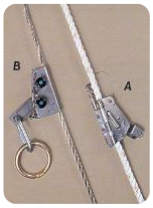
141

Common Pieces of Equipment

Shock Absorbing Lanyard

Self Retracting Lifelines

Carabiners



Rope & Cable Grabs

Cross-Arm Strap

Full Body Harness

142

Part 33
Personal Fall Protection Systems General Requirements

- 408.13395a(5) Lanyards and vertical lifelines must have a minimum breaking strength of 5,000 pounds.

- 408.13395a(6) Self-retracting lifelines and lanyards that automatically limit free fall distance to two feet (0.61 m) or less must have components capable of sustaining a minimum tensile load of 3,000 pounds (13.3 kN) applied to the device with the lifeline or lanyard in the fully extended position.

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Part 33
Personal Fall Protection Systems General Requirements Cont.

- 408.13395a(13) Anchorages used to attach to personal fall protection equipment shall be independent of any anchorage used to suspend employees or platforms on which employees work. Anchorages used to attach to personal fall protection equipment on mobile work platforms on powered industrial trucks shall be attached to an overhead member of the platform, at a point located above and near the center of the platform.

- 408.13395a(14)(a)Capable of supporting at least 5,000 pounds for each employee attached.

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Part 33
Personal Fall Protection Systems General Requirements Cont.

408.13395a(17) Personal fall protection systems and their components shall be used exclusively for employee fall protection and not for any other purpose, such as hoisting equipment or materials.

408.13395a(18) A personal fall protection system or its components subjected to impact loading shall be removed from service immediately and not used again until a competent person inspects the system or components and determines that it is not damaged and safe for use for employee personal fall protection.

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Part 33
Personal Fall Protection Systems General Requirements Cont.

- 408.13395a(19) Personal fall protection systems shall be inspected before initial use during each workshift for mildew, wear, damage, and other deterioration, and defective components shall be removed from service.

- 408.13395a(21) Ropes, belts, lanyards, lifelines, and harnesses used for personal fall protection shall be protected from being cut, abraded, melted, or otherwise damaged.

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Part 33
Personal Fall Protection Systems General Requirements Cont.

- 408.13395a(22) An employer **shall provide for prompt rescue of each employee** in the event of a fall.
- 408.13395a(23) Personal fall protection systems shall be worn with the attachment point of the body harness located in the center of the employee's back near shoulder level. The attachment point may be located in the pre-sternal position if the free fall distance is limited to two feet (0.6 m) or less.

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Part 33 Positioning System

"Positioning system, also known as work-positioning system" means a system of equipment and connectors that, when used with a body harness or body belt, allows an employee to be supported on an elevated vertical surface, such as a wall or windowsill, and work with both hands free.

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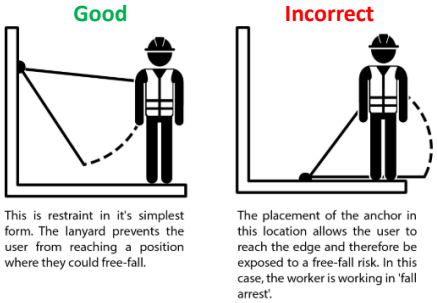
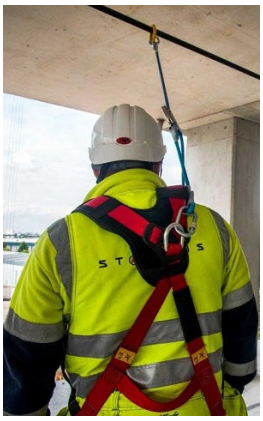
Part 33 Travel Restraint System

A Travel Restraint System, also known as a tether line, is designed to protect employees by not allowing them to get to the point where they could be exposed to a freefall.





150

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Part 33
Personal Fall Protection Training

Employee training considerations: Appendix C

- (e) As required by this standard, before an employee uses a fall protection system, an employer shall ensure that he or she is trained in the proper use of the system.
- The training should include the following:
  - The limits of the system
  - Proper anchoring and tie-off techniques
  - Estimating free fall distance, including determining elongation and deceleration distance
  - Methods of use
  - Inspection and storage

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Part 33
Personal Fall Protection Training (continued)

- Careless or improper use of fall protection equipment can result in serious injury or death.
- Employers and employees should be familiar with the material in this standard and appendices, as well as manufacturers' recommendations, before a system is used.
- Training should stress the importance of inspections prior to use, the limitations of the equipment to be used, and unique conditions at the worksite that may be important.

152

152

Part 33
Personal Fall Protection Systems Use Criteria

- 408.13395c(1) An employer shall ensure that any horizontal lifeline that may become a vertical lifeline, the device used to connect to the horizontal lifeline is capable of locking in both directions on the lifeline.

- 408.13395c(2) An employer shall ensure that the personal fall arrest systems are rigged in such a manner that the employee cannot free fall more than six feet (1.8 m) or contact a lower level. A free fall may be more than six feet (1.8 m) provided the employer can demonstrate the manufacturer designed the system to allow a free fall of more than six feet and tested the system to ensure a maximum arresting force of 1,800 pounds (8 kN) is not exceeded.

153

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Part 33
Personal Fall Protection Systems Use Criteria

- 408.13395c(3) Body belts are prohibited as part of a personal fall arrest system.

154

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Part 33
Personal Fall Protection Rescue

Rescue considerations Appendix C

- As required, when personal fall arrest systems are used, special consideration shall be given to rescuing an employee promptly should a fall occur.

Capital Safety® DBI Sala Suspension Trauma Safety Straps

Miller Relief Step™ Safety Device

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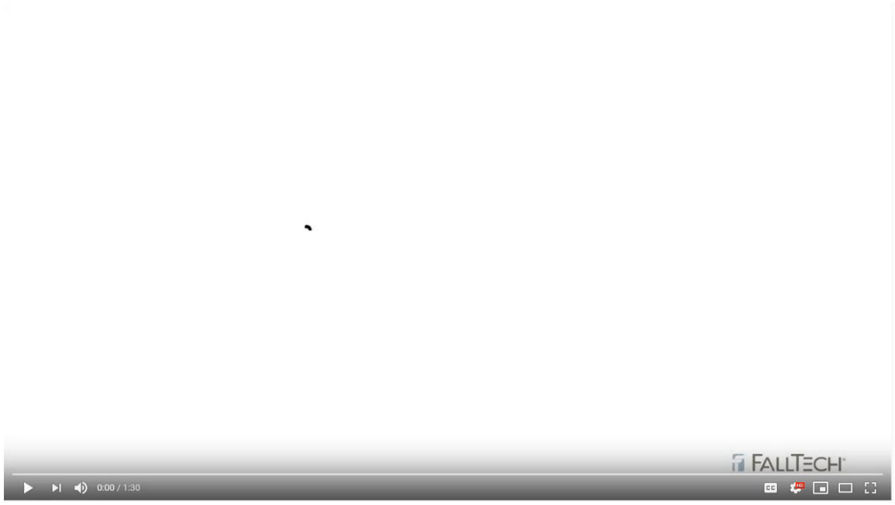
Rescue Plan Checklist

156

Fall Protection Equipment Video



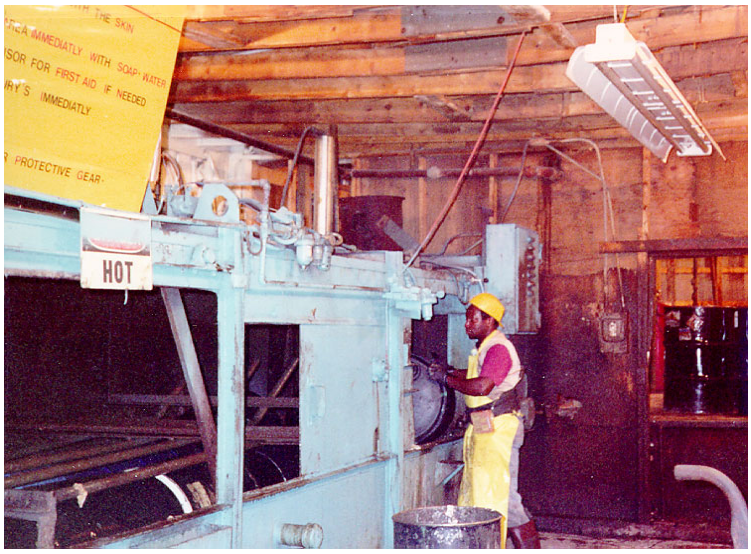
157

"What's missing?" Activity

Review the following six slides and determine the PPE needed/missing for each operation.

158

Hot liquid corrosive drum washer



159

159

Spray painting of parts bin

160

160

Gas metal arc welding

161

161

Pouring deck of a grey iron foundry

162

162

Saw cutting limestone cap

163

163

Placing concrete for foundation walls

164

164

Cleaning gutters

165

Review and Questions

- Part 6, 33, and 433 PPE Standards
- Hazard Assessment
- Selection
- Training

166

Assessment

The purpose of this assessment is to validate the knowledge learned in class.

Passing score of 70% correct is required.

Class reference materials/books are not allowed to be used during the assessment.

Collaboration/discussion with others is not allowed during the assessment.

Answers will be reviewed after everyone completes and submits their assessment.

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Thank you.

Don't Forget to Take the Survey

MIOSHA
Michigan Occupational Safety and Health Administration

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Parts 6, 33, & 433. Personal Protective Equipment Standards for GI & Const

Student Resources

MIOSHA Standards:

Construction Part 6. Personal Protective Equipment

General Industry Part 33. Personal Protective Equipment

Occupational Health Part 433. Personal Protective Equipment

MIOSHA Resources:

General Industry Threshold Chart

Construction Threshold Chart

Personal Protective Equipment for General Industry (SP-16)

DANGER – Hard Hat Area (CET-0324)

OSHA General Industry Fact Sheet for Walking-Working Surfaces and Fall Protection

MIOSHA Training Institute (MTI) Resources:

www.michigan.gov/mti

MIOSHA Training Calendar:

www.michigan.gov/mioshatraining

MIOSHA Homepage:

www.michigan.gov/miosha

Michigan Department of Labor and Economic Opportunity
Michigan Occupational Safety and Health Administration
Consultation Education and Training Division
525 W. Allegan St., P.O. Box 30643
Lansing, Michigan 48909-8143

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or
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