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DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS

DIRECTOR'S OFFICE

CONSTRUCTION SAFETY STANDARDS

Filed with the Secretary of State on August 31, 1976 (as amended November 21, 1980) (as amended November 23, 1982) (as amended May 17, 1983) (as amended September 10, 1985) as amended January 11, 1988) (as amended September 3, 1996) (as amended July 12, 1999) (as amended March 14, 2013) (as amended March 10, 2014) (as amended March 24, 2015) (**as amended November 9, 2016)**

These rules take effect immediately upon filing with the Secretary of State unless adopted under section 33, 44, or 45a(6) of 1969 PA 306.

Rules adopted under these sections become effective 7 days after filing with the Secretary of State.

(By authority conferred on the director of the department of licensing and regulatory affairs by sections 19 and 21 of 1974 PA 154, MCL 408.1019 and 408.1021 and Executive Reorganization Order Nos. 1996-2, 2003-1, 2008-4, and 2011-4, MCL 445.2001, 445.2011, 445.2025, and 445.2030)

R 408.40601, R 408.40603, R 408.40623, R 408.40624, R 408.40624a, R 408.40624b, and R 408.40650 of the Michigan Administrative Code are amended, as follows:

CONSTRUCTION SAFETY AND HEALTH STANDARD
PART 6. PERSONAL PROTECTIVE EQUIPMENT

Table of Contents:

GENERAL PROVISIONS

R 408.40601 Scope.

Rule 601. (1) This standard provides specifications for personal protective equipment and prescribes the use, selection, and maintenance of this equipment for the protection of the employee's head, face, eyes, hands, feet, and body during construction operations.

(2) Hearing protection shall be in compliance with Occupational Health Standard Part 680 "Noise Exposure for Construction," as referenced in R 408.40603.

(3) Respiratory protection shall be in compliance with Occupational Health Standard Part 451 "Respiratory Protection," as referenced in R 408.40603.

(4) Protective equipment, including personal protective equipment for eyes, face, head, hands, feet, and body, protective clothing, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact.

R 408.40603 Adopted and referenced standards.

Rule 603. (1) The following standards are adopted by reference in these rules and are available from the Document Center, Inc., Customer Service, 121 Industrial Road, Suite 8, Belmont, California 94002, USA, telephone: (650) 591-7600 or via the internet at website: www.document-center.com; at a cost as of the time of adoption of these rules, as stated in these rules.

(a) American National Standard Institute ANSI standard Z-41 "Personal Protection - Protective Footwear," 1991 edition. Cost: $49.95.

(b) ANSI Z-89.1 "American National Standard for Industrial Head Protection," 2003 edition. Cost: $20.00.

(c) ANSI Z-89.1 "American National Standard for Personnel Protection—Protective Headwear for Industrial Workers--Requirements," 1997 edition. Cost: $20.00.

(2) The following standards are adopted by reference in these rules and are available from IHS Global, 15 Inverness Way East, Englewood, Colorado 80112, USA, telephone number 1-800-854-7179, website: www.global.ihs.com; at a cost as of the time of adoption of these rules, as stated in these rules.

(a) ANSI/ISEA (International Safety Equipment Association) Z-87.1 "Occupational and Educational Personal Eye and Face Protection Devices," 2010 edition. Cost: $60.00.

(b) ANSI Z-87.1 "Occupational and Educational Personal Eye and Face Protection Devices," 2003 edition. Cost $68.00.

(c) ANSI Z-87.1 "Practice for Occupational and Educational Eye and Face Protection," 1989 edition, revised 1998. Cost: $148.00.

(d) ANSI Z-89.1 "American National Standard for Industrial Head Protection," 2009 edition. Cost: $35.00.

(e) American Society of Testing Materials ASTM Standard D-120, "Standard Specification for Rubber Insulating Gloves," 2009 edition. Cost: $58.00.

(f) ASTM D-178 "Standard Specification for Rubber Insulating Matting," 2001 edition with 2010 supplement. Cost: $47.00.

(g) ASTM D-1048 "Standard Specification for Rubber Insulating Blankets," 2012 Edition. Cost: $47.00.

(h) ASTM D-1049 "Standard Specification for Rubber Insulating Covers," 1998 edition with 2010 supplement. Cost: $47.00.

(i) ASTM D-1050 "Standard Specification for Rubber Insulating Line Hose," 2005 edition with 2011 supplement. Cost: $47.00.

(j) ASTM D-1051 "Standard Specification for Rubber Insulating Sleeves," 2008 edition. Cost: $58.00.

(k) ASTM F-478 "Standard Specification for In-Service Care of Insulating Line Hose and Covers," 2009 edition. Cost: $52.00.

(l) ASTM F-479 "Standard Specification for In-Service Care of Insulating Blankets," 2006 edition with 2011 supplement. Cost: $47.00.

(m) ASTM F-496 "Standard Specification for In-Service Care of Insulating Gloves and Sleeves," 2008 edition. Cost: $58.00.

(n) ASTM F-712 "Standard Test Methods and Specifications for Electrically Insulating Plastic Guard Equipment for Protection of Workers," 2006 edition with 2011 supplement. Cost $47.00.

(o) ASTM F-819 "Standard Terminology Relating to Electrical Protective Equipment for Workers," 2010 edition. Cost: $41.00.

(p) ASTM F-1236 "Standard Guide for Visual Inspection of Electrical Protective Rubber Products," 1996 Edition with 2012 supplement. Cost: $ 47.00.

(q) Institute of Electrical and Electronics Engineers IEEE Standard 516 "Guide for Maintenance Methods on Energized Power Lines," 2009 edition. Cost: $135.00.

(3) The standards adopted in these rules are available for inspection at the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, P.O. Box 30643, Lansing, Michigan, 48909-8143.

(4) The standards adopted in these rules may be obtained from the publisher or may be obtained from the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, P.O. Box 30643, Lansing, Michigan, 48909-8143, plus $20.00 for shipping and handling.

(5) The following Michigan occupational safety and health (MIOSHA) standards are referenced in these rules. Up to 5 copies of these standards may be obtained at no charge from the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, P.O. Box 30643, Lansing, Michigan, 48909-8143 or via the internet at website: www.michigan.gov/mioshastandards. For quantities greater than 5, the cost, as of the time of adoption of these rules, is 4 cents per page.

(a) Construction Safety Standard Part 16. "Power Transmission and Distribution," R 408.41601 to R 408.41658.

(b) Construction Safety Standard Part 45 "Fall Protection," R 408.44501 to R 408.44502.

(c) Occupational Health Standard Part 451 "Respiratory Protection," R 325.60051 to R 325.60052.

(d) Occupational Health Standard Part 680 "Noise Exposure for Construction," R 325.60131

(6) The appendices are informational only and are not intended to create any additional obligations or requirements not otherwise imposed or to detract from any established obligations or requirements.

R 408.40614 Definitions, C to F.

Rule 614. (1) "Contaminant" means any material which by reason of its action upon, within, or to a person is likely to cause physical harm.

(2) "Footwear" means wearing apparel for the feet, such as shoes, boots, slippers, or overshoes, excluding hosiery.

R 408.40615 Definitions, H to R.

Rule 615. (1) "Helmet," also called a hard hat or cap, means a device that is worn on the head and that is designed to provide limited protection against impact, flying particles, or electric shock.

(2) "Manufacturer" means a business entity that marks or directs the permanent marking of the components or complete devices as compliant with this standard, and sells them as compliant.

(3) "Metatarsal guards" mean guards that are designed to protect the top of the foot from the toes to the ankle over the instep of the foot. These guards may be attached to the outside of shoes.

(4) "O.D." means optical density and refers to the light refractive characteristics of a lens.

(5) "Protective footwear" means footwear that is designed, constructed, and classified to protect the wearer from a potential hazard or hazards.

(6) "Radiant energy" means energy that travels outward in all directions from its sources

R 408.40616 Definitions, S, T.

Rule 616. (1) "Safety line" means a device used for emergency rescue work.

(2) "Sanitizing" means an act or process of destroying organisms that may cause disease.

(3) "Shell" means the portion of welding helmet or handshield that covers the wearer's face and is the part of a helmet which includes the outermost surface.

(4) "Toe guards" means the guards that fit over the toes of regular shoes to protect the toes from impact and compression hazards. These guards may be attached to the outside of shoes.

R 408.40617 Employer's and employee's responsibilities.

Rule 617. (1) An employer shall not permit defective or damaged personal protective equipment to be used.

(2) An employer shall require each employee to wear personal protective equipment as prescribed by the manufacturer when required by any Michigan occupational safety and health act (MIOSHA) rule.

(3) If personal protective equipment is required and is worn in direct contact with the skin, the equipment shall be sanitized before being reissued to another employee.

(4) 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.

(5) All personal protective equipment shall be of safe design and constructed for the work to be performed.

PAYMENT FOR PERSONAL PROTECTIVE EQUIPMENT

R 408.40617a Payment for personal protective equipment (PPE).

Rule 617a. (1) 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.

(2) An employer shall pay for replacement PPE, as necessary, under either of the following conditions:

(a) When the PPE no longer provides the protection it was designed to provide.

(b) When the previously provided PPE is no longer adequate or functional.

(3) When an employee has lost or intentionally damaged the PPE issued to him or her, an employer is not required to pay for its replacement and may require the employee to pay for its replacement.

(4) An employer is not required to pay for prescription safety eyewear with removable or permanent sideshields as long as the employer provides safety eyewear that fits over an employee's prescription lenses.

(5) An employer is not required to pay for non-specialty prescription safety eyewear, provided that the employer permits these items to be worn off the job-site.

(6) An employer is not required to pay for non-specialty safety-toe protective footwear, including steel-toe shoes or steel-toe boots, provided that the employer permits these items to be worn off the job-site.

(7) An employer shall provide, at no cost to employees, metatarsal guards attachable to shoes when metatarsal protection is necessary, when both of the following apply:

(a) If metatarsal protection is necessary and an employer requires employees to use metatarsal shoes instead of detachable guards, then the employer shall provide the metatarsal shoe at no cost to the employee.

(b) If an employer provides metatarsal guards and allows the employee, at his or her request, to use shoes or boots with built-in metatarsal protection, then the employer is not required to pay for the metatarsal shoes or boots.

(8) An employer is not required to pay for either of the following:

(a) Everyday clothing, which includes any of the following:

(i) Long-sleeve shirts.
(ii) Long pants.
(iii) Street shoes.
(iv) Normal work boots.
(v) Ordinary clothing.
(vi) Skin creams.

(b) Other items used solely for protection from weather, which includes any of the following:

(i) Winter coats.
(ii) Jackets.
(iii) Gloves.
(iv) Parkas.
(v) Rubber boots.
(vi) Hats.
(vii) Raincoats.
(viii) Ordinary sunglasses.
(ix) Sunscreen.

(9) An employer shall pay for protection when ordinary weather gear is not sufficient to protect an employee and special equipment or extraordinary clothing is needed to protect the employee from unusually severe weather conditions. Clothing used in artificially-controlled environments with extreme hot or cold temperatures, such as freezers, is not considered part of the weather gear exception.

(10) All of the following apply to upgraded and personalized PPE:

(a) An employer is not required to pay for PPE requested by an employee that exceeds the PPE requirements, provided that the employer provides PPE that meets the standards at no cost to the employee.

(b) If an employer allows an employee to acquire and use upgraded or personalized PPE, then the employer is not required to reimburse the employee for the equipment, provided that the employer has provided adequate PPE at no cost to the employee.

(c) An employer shall evaluate an employee's upgraded or personalized PPE to ensure that it is in compliance with all of the following:

(i) Adequate to protect from hazards present in the workplace.
(ii) Properly maintained.
(iii) Kept in a sanitary condition.

(11) When the provisions of another MIOSHA standard specify whether the employer shall pay for specific equipment, the payment provisions of that standard prevails.

HEAD PROTECTION EQUIPMENT

R 408.40621 Criteria for head protection.

Rule 621. (1) An employer shall provide each employee with head protection that meets the specifications contained in any of the following consensus standards:

(a) ANSI Z-89.1, "American National Standard for Industrial Head Protection," 2009 edition, as adopted in R 408.40603.

(b) ANSI Z-89.1, "American National Standard for Industrial Head Protection," 2003 edition, as adopted in R 408.40603.

(c) ANSI Z-89.1 "American National Standard for Personnel Protection—Protective Headwear for Industrial Workers--Requirements," 1997 edition, as adopted in R 408.40603.

(2) Any head protection device that an employer demonstrates is at least as effective as a head protection device constructed in accordance with 1 of the consensus standards adopted in subrule (1) of this rule is considered to be in compliance with this rule.

(3) An employer shall ensure that the head protection provided for each employee exposed to high-voltage electric shock and burns meets the specifications contained in Section 9.7 "Electrical Insulation" of any of the ANSI standards adopted by reference in subrule (1) of this rule.

R 408.40622 Use of head protection.

Rule 622. (1) 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:

(a) Falling or flying objects or particles.

(b) Electrical shock and burns.

(c) From other harmful contacts or exposures.

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

(3) A chin strap shall be provided and shall be used when an employee is exposed to weather or work operations that may cause the head protection equipment to be displaced.

EYE AND FACE PROTECTION

R 408.40623 Eye and face protection; consensus standards.

Rule 623. (1) All protective eye and face protection devices shall be in compliance with any of the following consensus standards:

(a) ANSI/ISEA Z-87.1 "Occupational and Educational Personal Eye and Face Protection Devices," 2010 edition, as adopted in R 408.40603.

(b) ANSI Z-87.1 "Occupational and Educational Personal Eye and Face Protection Devices," 2003 edition, as adopted in R 408.40603.

(c) ANSI Z-87.1 "Practice for Occupational and Educational Eye and Face Protection," 1989 edition, revised 1998, as adopted in R 408.40603.

(2) Protective eye and face protection devices that the employer demonstrates are at least as effective as protective eye and face protection devices that are constructed in accordance with 1 of the consensus standards adopted in this rule shall be considered to be in compliance with the requirements of this rule.

R 408.40624 Use of eye and face protection.

Rule 624. (1) An employer shall ensure that each affected employee uses appropriate eye and face protection, when exposed to eye or face hazards or if risk of injury exists from any of the following:

(a) Flying objects or particles.
(b) Harmful contacts.
(c) Exposures.
(d) Molten metal.
(e) Liquid chemicals.
(f) Acids or caustic liquids.
(g) Chemical gases or vapors.
(h) Glare.
(i) Potentially injurious light radiation.
(j) Electrical flash.
(k) A combination of these hazards in subdivisions (a) to (j) of this subrule.

Note: Appendix B, Appendix Table 1, "Eye and Face Protector Selection Chart," and Appendix Figure 1, "Eye and Face Protective Devices Chart," shall be used as a guide in the selection of the proper eye and face protection.

(2) An employer shall ensure that each affected employee who wears prescription lenses while engaged in operations that involve eye hazards shall wear eye protection that incorporates either of the following:

(a) Eye protection that incorporates the prescription in its design.

(b) Eye protection that can be worn over prescription lenses without disrupting the proper position of the prescription lenses or the protective lenses.

(3) An employer shall ensure that a protector is in compliance with all of the following minimum requirements:

(a) Provides adequate protection against the particular hazards for which it is designed.

(b) Be reasonably comfortable when worn under the designated conditions.

(c) Fits snugly and does not unduly interfere with movements of the wearer.

(d) Be durable.
(e) Be capable of being disinfected.
(f) Be easily cleanable.

(4) An employer shall ensure that eye and face personal protective equipment is distinctly marked to facilitate identification of the manufacturer.

(5) An employer shall ensure that each affected employee uses eye protection that provides side protection when there is a hazard from flying objects. Detachable side protectors, such as clip-on or slide-on sideshields, that are in compliance with the applicable requirements of this standard are acceptable.

WELDING PROTECTION

R 408.40624a Welding protection.

Rule 624a. (1) Table 2 shall be used as a guide for the selection of the proper shade numbers of filter lenses or plates used in welding.

(2) When an employee is welding and using a welding shield, the shield shall incorporate a safety glass feature with a flip-up filter lens or the employee shall wear safety glasses with side shields or goggles under the shield when the shield is raised and is exposed to flying objects.

(3) Shades more dense than those listed in Table 2 may be used to suit the individual's needs.

(4) Table 2 reads as follows:

TABLE 2	
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

LASER PROTECTION

R 408.40624b Laser protection.

Rule 624b. (1) All employees whose occupation or assignment requires exposure to laser beams shall be furnished suitable laser safety goggles that will protect for the specific wavelength of the laser and be of optical density (O.D.) adequate for the energy involved.

(2) Table 3 lists the maximum power or energy density for which adequate protection is afforded by glasses of optical densities from 5 through 8.

(3) Output levels falling between lines in this table shall require the higher optical density.

(4) All protective goggles shall bear a label identifying all of the following data:

(a) The laser wavelengths for which use is intended.

(b) The optical density of those wavelengths.

(c) The visible light transmission.

(5) Table 3 reads as follows:

TABLE 3
SELECTING LASER SAFETY GLASS

INTENSITY, CW MAXIMUM POWER DENSITY (WATTS/CM^2)	ATTENUATION	
	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.		

FOOT AND TOE PROTECTION

R 408.40625 Foot and toe protection; consensus standards; specific requirements.

Rule 625. (1) Safety toe footwear shall bear a permanent mark to show the manufacturer's name or trademark and to show certification of compliance with ANSI standard Z-41 "Personal Protection – Protective Footwear," 1991 edition, as adopted in R 408.40603.

(2) An employer shall ensure that each affected employee wears foot protection or toe protection, or both, if conditions of the job are likely to cause a foot injury.

(3) If a hazard is created from a process, 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:

(a) Boots.
(b) Overshoes.
(c) Rubbers.
(d) Wooden-soled shoes.
(e) The equivalent to subdivisions (a) to (d) of this subrule.

HAND AND BODY PROTECTION

R 408.40626 Hand and body protection.

Rule 626. (1) 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.

(2) Cloth gloves shall not be worn when operating rotating equipment such as a drill or a powered threading machine.

(3) Precautions shall be taken with regard to synthetic clothing that is worn near a source of flame, spark, a hot surface, or material that could ignite the clothing.

(4) An employee shall not wear loose clothing, neckwear encircling the neck, or exposed jewelry, such as rings and necklaces, near a machine having reciprocating or rotating shafts or spindles or when handling material that could catch on clothing or jewelry and cause injury. A ring shall not be worn on the finger unless covered by a glove or tape.

(5) When an employee is exposed to hazards such as radiation, alkalies, acids, abrasives, and temperature extremes other than those caused by weather conditions, appropriate head, body, and hand protection shall be worn to protect the employee from that hazard. Such personal protective equipment shall be provided by the employer.

FALL PROTECTION

R 408.40631 Fall protection.

Rule 631. An employer shall ensure that each employee whose fall protection is not covered by another MIOSHA safety standard, and the employee's work area is more than 6 feet above the ground, floor, water, or other surface, shall be protected as prescribed in Construction Safety Standard Part 45 "Fall Protection," as referenced in R 408.40603. The following systems are included in Construction Safety Standard Part 45 "Fall Protection:"

(a) Guardrail systems.
(b) Safety net systems.
(c) Personal fall arrest systems.

See Appendix C for reference to the correct safety standards for construction industry threshold heights requiring fall prevention/protection equipment.

R 408.40636 Working over or near water.

Rule 636. (1) Where a possibility of drowning exists, each employee working over or adjacent to water shall wear a life jacket or buoyant work vest. The life jacket or buoyant vest shall bear a label, "U.S. Coast Guard approved."

(2) Before each use, a competent person shall inspect the life jacket or buoyant vest for defects which might alter its strength or buoyancy. Defective units shall not be used.

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

(4) Not less than 1 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.

ELECTRICAL PROTECTIVE EQUIPMENT

R 408.40650 Design requirements for specific types of electrical protective equipment.

Rule 650. (1) Rubber insulating blankets, rubber insulating matting, rubber insulating covers, rubber insulating line hose, rubber insulating gloves, and rubber insulating sleeves shall meet the requirements of this rule.

(2) Manufacture and marking of rubber insulating equipment shall be as follows:

(a) Blankets, gloves, and sleeves shall be produced by a seamless process.

(b) Each item shall be clearly marked as follows:

(i) Class 00 equipment shall be marked class 00.

(ii) Class 0 equipment shall be marked class 0.

(iii) Class 1 equipment shall be marked class 1.

(iv) Class 2 equipment shall be marked class 2.

(v) Class 3 equipment shall be marked class 3.

(vi) Class 4 equipment shall be marked class 4.

(vii) Non-ozone-resistant equipment shall be marked type I.

(viii) Ozone-resistant equipment shall be marked type II.

(ix) Other relevant markings, such as the manufacturer's identification and the size of the equipment, may also be provided.

(c) Markings shall be non-conducting and shall be applied in such a manner as not to impair the insulating qualities of the equipment.

(d) Markings on gloves shall be confined to the cuff portion of the glove.

(3) Electrical requirements shall be all of the following:

(a) 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, all of the following apply:

(i) The proof test shall reliably indicate that the equipment can withstand the voltage involved.

(ii) The test voltage shall be applied continuously for 3 minutes for equipment other than matting and shall be applied continuously for 1 minute for matting.

(iii) Gloves shall also be capable of separately withstanding the alternating current proof-test voltage specified in Table A after a 16-hour water soak.

(b) When the alternating current proof test is used on gloves, the 60-hertz proof-test current may not exceed the values specified in Table A at any time during the test period all of the following apply:

(i) If the alternating current proof test is made at a frequency other than 60 hertz, the permissible proof-test current shall be computed from the direct ratio of the frequencies.

(ii) For the test, gloves (right side out) shall be filled with tap water and immersed in water to a depth that is in accordance with Table C. Water shall be added to or removed from the glove, as necessary, so that the water level is the same inside and outside the glove.

(iii) After the 16-hour water soak specified in this subrule, the 60-hertz proof-test current may not exceed the values given in Table A by more than 2 milliamperes.

(c) Equipment that has been subjected to a minimum breakdown voltage test may not be used for electrical protection. See subrule (3) of this rule.

(d) Material used for Type II insulating equipment shall be capable of withstanding an ozone test, with no visible effects. The ozone test shall reliably indicate that the material will resist ozone exposure in actual use. Any visible signs of ozone deterioration of the material, such as checking, cracking, breaks, or pitting, is evidence of failure to meet the requirements for ozone-resistant material. See subrule (3) of this rule.

(4) Workmanship and finish shall comply with both of the following:

(a) 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.

(b) Surface irregularities that may be present on all rubber goods, because of imperfections on forms or molds or because of inherent difficulties in the manufacturing process, and that may appear as indentations, protuberances, or imbedded foreign material are acceptable under both of the following conditions:

(i) The indentation or protuberance blends into a smooth slope when the material is stretched.

(ii) Foreign material remains in place when the insulating material is folded and stretches with the insulating material surrounding it.

(5) Rubber insulating equipment meeting the national consensus standards in Table 4 is considered to be in compliance with the performance requirements of these rules.

TABLE 4 AMERICAN SOCIETY OF TESTING MATERIALS STANDARDS			
STANDARD TITLE	**ASTM NUMBER**	**EDITION**	**SUPPLEMENT**
Standard Specification for Rubber Insulating Gloves	D-120	2009	-
Standard Specification for Rubber Insulating Matting	D-178	2001	2010
Standard Specification for Rubber Insulating Blankets	D-1048	2012	
Standard Specification for Rubber Insulating Covers	D-1049	1998	2010
Standard Specification for Rubber Insulating Line Hose	D-1050	2005	2011
Standard Specification for Rubber Insulating Sleeves	D-1051	2008	-
These standards also contain specifications for conducting the various tests required in these rules. For example, the alternating current and direct current proof tests, the breakdown test, the water-soak procedure, and the ozone test mentioned in these rules are described in detail in these ASTM standards.			
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.			
ASTM F-819 “Standard Terminology Relating to Electrical Protective Equipment for Workers,” 2010 edition, as adopted in R 408.40603, includes definitions of terms relating to the electrical protective equipment covered in these rules.			

R 408.40655 Design requirements for other types of electrical protective equipment.

Rule 655. (1) The following requirements apply to the design and manufacture of electrical protective equipment that is not covered by R 408.40650:

(2) Insulating equipment used for the protection of employees shall be capable of withstanding, without failure, the voltages that may be imposed upon it.

Note 1 to subrule (2): These voltages include transient over-voltages, such as switching surges, as well as nominal line voltage. See Construction Safety Standard Part 16 "Power Transmission and Distribution," Appendix B, as referenced in R 408.40603, for a discussion of transient over-voltages on electric power transmission and distribution systems.

Note 2 to subrule (2): See IEEE 516 "Guide for Maintenance Methods on Energized Power Lines," 2009 edition, as adopted in R 408.40603, for methods of determining the magnitude of transient over-voltages on an electrical system and for a discussion comparing the ability of insulation equipment to withstand a transient overvoltage based on its ability to withstand alternating current voltage testing.

(3) Equipment current shall comply with both of the following:

(a) Protective equipment used for the primary insulation of employees from energized circuit parts shall be capable of passing a current test when subjected to the highest nominal voltage on which the equipment is to be used.

(b) When insulating equipment is tested pursuant to these rules, the equipment current shall not exceed 1 microampere per kilovolt of phase-to-phase applied voltage.

Note 1 to subrule (3): This rule shall apply to equipment that provides primary insulation of employees from energized parts. It does not apply to equipment used for secondary insulation or equipment used for brush contact only.

Note 2 to subrule (3): For alternating current excitation, this current shall consist of the following components:

(i) Capacitive current because of the dielectric properties of the insulating material itself.

(ii) Conduction current through the volume of the insulating equipment.

(iii) Leakage current along the surface of the tool or equipment.

The conduction current shall be normally negligible. For clean, dry insulating equipment, the leakage current shall be small, and the capacitive current shall be predominate.

Note 3 to (3): Plastic guard equipment is considered to conform to the performance requirements of this rule, if it meets, and is used in accordance with ASTM F-712 "Standard Test Methods and Specifications for Electrically Insulating Plastic Guard Equipment for Protection of Workers," 2006 edition with 2011 supplement, as adopted in R 408.40603.

R 408.40660 In-service care and use of electrical protective equipment.

Rule 660. (1) Electrical protective equipment shall be maintained in a safe, reliable condition.

(2) The following requirements apply to rubber insulating blankets, rubber insulating covers, rubber insulating line hose, rubber insulating gloves, and rubber insulating sleeves.

(3) Maximum use voltages shall conform to those listed in Table D.

(4) 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 to subrule (4): 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.

(5) Insulating equipment with any of the following defects shall not be used.

(a) A hole, tear, puncture, or cut.

(b) Ozone cutting or ozone checking, that is a series of interlacing cracks produced by ozone on rubber under mechanical stress.

(c) An embedded foreign object.

(d) 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.

(6) Insulating equipment found to have other defects that might affect its insulating properties shall be removed from service and returned for testing under subrules (10) and (11) of this rule.

(7) Insulating equipment shall be cleaned as needed to remove foreign substances.

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

(a) Light.

(b) Temperature extremes.

(c) Excessive humidity.

(d) Ozone.

(e) Other damaging substances and conditions.

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

(a) 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 to subrule (9)(a): 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.

(b) If the voltage does not exceed 250 volts, ac, or 375 volts, direct current, protector gloves shall not be used with class 00 gloves, under limited-use conditions, when small equipment and parts manipulation necessitate unusually high finger dexterity.

Note to subrule (9)(b): 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 need to take extra care to avoid handling sharp objects.

(c) Any other class of glove may be used without protector gloves, under limited-use conditions, when small equipment and parts manipulation necessitate unusually high finger dexterity but only if the employer can demonstrate that the possibility of physical damage to the gloves is small and if the class of glove is 1 class higher than that required for the voltage involved.

(d) Insulating gloves that have been used without protector gloves shall not be reused until they have been tested under the provisions of this rule.

(10) Electrical protective equipment shall be subjected to periodic electrical tests. Test voltages and the maximum intervals between tests shall be pursuant to Table D and Table E.

(11) The test method used in this subrule shall reliably indicate whether the insulating equipment can withstand the voltages involved.

Note to subrule (11): The standard electrical test methods considered as meeting this requirement are listed in Table 5.

(12) Insulating equipment failing to pass inspections or electrical tests shall not be used by employees, except as follows:

(a) Rubber insulating line hose may be used in shorter lengths with the defective portion cut off.

(b) Rubber insulating blankets may be salvaged by severing the defective area from the undamaged portion of the blanket. The resulting undamaged area shall not be smaller than 560 millimeters by 560 millimeters (22 inches by 22 inches) for class 1, 2, 3, and 4 blankets.

(c) Rubber insulating blankets may be repaired using a compatible patch that results in physical and electrical properties equal to those of the blanket.

(d) Rubber insulating gloves and sleeves with minor physical defects, such as small cuts, tears, or punctures, may be repaired by the application of a compatible patch. Also, rubber insulating gloves and sleeves with minor surface blemishes may be repaired with a compatible liquid compound. The repaired area shall have electrical and physical properties equal to those of the surrounding material. Repairs to gloves shall be permitted only in the area between the wrist and the reinforced edge of the opening.

(13) Repaired insulating equipment shall be retested before it may be used by employees.

(14) 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 to subrule (14): 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.

TABLE 5 AMERICAN SOCIETY OF TESTING MATERIALS STANDARDS			
STANDARD TITLE	**ASTM NUMBER**	**EDITION**	**SUPPLEMENT**
Standard Specification for Rubber Insulating Gloves	D-120	2009	-
Standard Specification for Rubber Insulating Matting	D-178	2001	2010
Standard Specification for Rubber Insulating Blankets	D-1048	2012	
Standard Specification for Rubber Insulating Covers	D-1049	1998	2010
Standard Specification for Rubber Insulating Line Hose	D-1050	2005	2011
Standard Specification for Rubber Insulating Sleeves	D-1051	2008	-
Standard Specification for In-Service Care of Insulating Line Hose and Covers	F-478	2009	-
Standard Specification for In-Service Care of Insulating Blankets	F-479	2006	2011
Standard Specification for In-Service Care of Insulating Gloves And Sleeves	F-496	2008	-

TABLE A ALTERNATING CURRENT PROOF-TEST REQUIREMENTS					
CLASS OF EQUIPMENT	**PROOF-TEST VOLTAGE RMS V**	**MAXIMUM PROOF-TEST CURRENT, mA (Globes Only)**			
		280-mm (11 in.) Glove	**360-mm (14 in.) Glove**	**410-mm (16 in.) Glove**	**460-mm (18 in.) Glove**
00	2,500	8	12	-	-
0	5,000	8	12	14	16
1	10,000	-	14	16	18
2	20,000	-	16	18	20
3	30,000	-	18	20	22
4	40,000	-	-	22	24

TABLE B DIRECT CURRENT PROOF-TEST REQUIREMENTS	
CLASS OF EQUIPMENT	**PROOF-TEST VOLTAGE**
00	10,000
0	20,000
1	40,000
2	50,000
3	60,000
4	70,000

NOTE: The dc voltages listed in this table are not appropriate for proof testing rubber insulating line hose or covers. For this equipment, dc proof tests shall use a voltage high enough to indicate that the equipment can be safely used at the voltages listed in Table D.

See ASTM D-1050 “Standard Specification for Rubber Insulating Line Hose,” 2005 edition with 2011 supplement and ASTM D-1049 “Standard Specification for Rubber Insulating Covers,” 1998 edition with 2010 supplement, as adopted in R 408.40603, for further information on proof tests for rubber insulating line hose and covers, respectively.

TABLE C GLOVE TESTS – WATER LEVEL[1, 2]				
CLASS OF GLOVE	**ALTERNATING CURRENT PROOF TEST**		**DIRECT CURRENT PROOF TEST**	
	MM	**IN**	**MM**	**IN**
00	38	1.5	38	1.5
0	38	1.5	38	1.5
1	38	1.5	51	2.0
2	64	2.5	76	3.0
3	89	3.5	102	4.0
4	127	5.0	153	6.0

[1] The water level is given as the clearance from the reinforced edge of the glove to the water line, with a tolerance of ±13 mm.(±0.5 in.).

[2] If atmospheric conditions make the specified clearances impractical, the clearances may be increased by a maximum of 25 mm.(1 in.).

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.			

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 may not be placed into service unless it has been electrically tested within the previous 12 months.	

APPENDIX A
RESOURCES
(Non-Mandatory)

For further assistance in implementing requirements for a hazard assessment and the selection of personal protective equipment, contact MIOSHA, OSHA, NIOSH, your union, or industry association.
MIOSHA Michigan Occupational Safety and Health Administration Consultation Education & Training Division (CET) www.michigan.gov/cet Phone: 517-284-7720
OSHA Federal Occupational Safety and Health Administration http://www.osha.gov
NIOSH National Institute of Occupational Safety and Health http://www.cdc.gov/niosh

APPENDIX B
GUIDELINES FOR HAZARD ASSESSMENT AND PERSONAL PROTECTIVE EQUIPMENT SELECTION
(Non-Mandatory)

This Appendix is intended to provide compliance assistance for employers and employees in implementing requirements for a hazard assessment and the selection of personal protective equipment.

1. CONTROLLING HAZARDS.

PPE devices alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound manufacturing practices.

2. ASSESSMENT AND SELECTION.

It is necessary to consider certain general guidelines for assessing the head, face, eyes, hands, feet, and body for hazard situations that exist in an occupational or educational operation or process, and to match the protective devices to the particular hazard. It should be the responsibility of the safety officer to exercise common sense and appropriate expertise to accomplish these tasks.

3. ASSESSMENT GUIDELINES.

In order to assess the need for PPE the following steps should be taken:

a. Survey. Conduct a walk-through survey of the areas in question. The purpose of the survey is to identify sources of hazards to workers and co-workers. Consideration should be given to the basic hazard categories:

(a) Impact.
(b) Penetration.
(c) Compression (roll-over).
(d) Chemical.
(e) Heat.
(f) Harmful dust.
(g) Light (optical) radiation.

b. Sources. During the walk-through survey the safety officer should observe:

(a) Sources of motion; i.e., machinery or processes where any movement of tools, machine elements or particles could exist, or movement of personnel that could result in collision with stationary objects.
(b) Sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, etc.
(c) Types of chemical exposures.
(d) Sources of harmful dust.
(e) Sources of light radiation, i.e., welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.
(f) Sources of falling objects or potential for dropping objects.
(g) Sources of sharp objects which might pierce the feet or cut the hands.
(h) Sources of rolling or pinching objects which could brush the feet.
(i) Layout of workplace and location of co-workers.
(j) Any electrical hazards.

In addition, injury/accident data should be reviewed to help identify problem areas.

c. Organize data. Following the walk-through survey, it is necessary to organize the data and information for use in the assessment of hazards. The objective is to prepare for an analysis of the hazards in the environment to enable proper selection of protective equipment.

d. Analyze data. Having gathered and organized data on a workplace, an estimate of the potential for injuries should be made. Each of the basic hazards (paragraph 3.a.) should be reviewed and a determination made as to the type, level of risk, and seriousness of the potential injury from each of the hazards found in the area. The possibility of exposure to several hazards simultaneously should be considered.

4. SELECTION GUIDELINES.

After completion of the procedures in paragraph 3, the general procedure for selection of protective equipment is to:

(a) Become familiar with the potential hazards and the type of protective equipment that is available, and what it can do; i.e., splash protection, impact protection, etc.

(b) Compare the hazards associated with the environment; i.e., impact velocities, masses, projectile shape, radiation intensities, with the capabilities of the available protective equipment.

(c) Select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards.

(d) Fit the user with the protective device and give instructions on care and use of the PPE. It is very important that end users be made aware of all warning labels for and limitations of their PPE.

5. FITTING THE DEVICE.

Careful consideration must be given to comfort and fit. PPE that fits poorly will not afford the necessary protection. Continued wearing of the device is more likely if it fits the wearer comfortably. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

6. DEVICES WITH ADJUSTABLE FEATURES.

Adjustments should be made on an individual basis for a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection against dust and chemical splash to ensure that the devices are sealed to the face. In addition, proper fitting of helmets is important to ensure that it will not fall off during work operations. In some cases a chin strap may be necessary to keep the helmet on an employee's head. (Chin straps should break at a reasonable low force, however, so as to prevent a strangulation hazard). Where manufacturer's instructions are available, they should be followed carefully.

7. REASSESSMENT OF HAZARDS.

It is the responsibility of the safety officer to reassess the workplace hazard situation as necessary, by identifying and evaluating new equipment and processes, reviewing accident records, and reevaluating the suitability of previously selected PPE.

8. SELECTION CHART GUIDELINES FOR EYE AND FACE PROTECTION.

Some occupations (not a complete list) for which eye protection should be routinely considered are:

Assemblers.
Carpenters.
Chemical process operators and handlers.
Electricians.
Grinding machine operators.
Laborers.
Lathe and milling machine operators.
Machinists.
Mechanics and repairers.
Millwrights.
Plumbers and pipe fitters.
Sanders.
Sawyers.
Sheet metal workers and tinsmiths.
Timber cutting and logging workers.
Welders

Appendix Table 1, "Eye and Face Protector Selection Chart," and Appendix Figure 1, "Eye and Face Protective Devices," are intended to aid in identifying and selecting the types of eye and face protectors that are available, their capabilities and limitation for the hazard "activity and assessment" operations that are listed.

APPENDIX TABLE 1
EYE AND FACE PROTECTOR SELECTION

This guide is not intended to be the sole reference in selecting the proper eye and face protector.

Care shall be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of the hazards must be provided.

ACTIVITY AND ASSESSMENT	PROTECTOR CATEGORY AND STYLES	LIMITATIONS	NOT RECOMMENDED
IMPACT			
Chipping, grinding, machining, masonry work, riveting, and sanding. Flying fragments, objects, large chips, particles, sand, dirt, etc.	Spectacles, goggles: B, C, D, E, F, G, H, I, J, K, L. For Severe exposure add N. Respirators, R, T. Faceshields shall only be worn over spectacles or goggles. Persons whose vision requires the use of prescription lenses shall wear either protective devices fitted with prescription lenses or protective devices designed to be worn over regular prescription eyewear. Wearers of contact lenses shall also be required to wear appropriate spectacles or goggles depending on the specific hazard. Dusty and/or chemical environments may represent an additional hazard to contact lens wearers. Wearing of contact lenses under an R respirator is permitted. Goggles, helmets and faceshield windows that bear the marking “Z-87+” comply with the High Impact Test Requirements. Those with “Z-87” markings comply only with Basic Impact Testing Requirements. Spectacle lenses that are marked with the manufacturers logo and a “+” sign comply with the High Impact Test Requirements. Those spectacle lenses marked with the manufacturers logo and no “+” comply only with Basic Impact Testing Requirements. (It is important during the selection process to remember that different product categories are tested at different levels of impact resistance. Goggles are tested at a higher level of impact than spectacles and face shields are tested at a higher level than goggles.) The Z-87-2 frame marking indicates the frame meets high impact requirements with a minimum lens thickness of 2mm.	Protective devices do not provide unlimited protection. Note: Caution should be exercised in the use of metal frame protective devices in electrical hazard areas. Metal frame protective devices could potentially cause electrical shock and electrical burns through contact with, or thermal burns from exposure to the hazards of electrical energy, which include radiation from accidental arcs. Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleaning may be required.	Protectors that do not provide protection from side exposure. Filter or tinted lenses that restrict light transmittance, unless it is determined that a glare hazard exists. Refer to OPTICAL RADIATION. Use of faceshields alone, without spectacles or goggles.

APPENDIX TABLE 1
EYE AND FACE PROTECTOR SELECTION

This guide is not intended to be the sole reference in selecting the proper eye and face protector.

Care shall be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of the hazards must be provided.

ACTIVITY AND ASSESSMENT	PROTECTOR CATEGORY AND STYLES	LIMITATIONS	NOT RECOMMENDED
HEAT			
Furnace operations, pouring, casting, hot dipping, gas cutting, and welding.	Note: Operations involving heat may also involve optical radiation. (See electric arc, gas, and glare under Optical Radiation below.) Protection from both hazards shall be provided. Faceshields shall only be worn over spectacles or goggles.	Spectacles, cup and cover type goggles do not provide unlimited facial protection. Operations involving heat may also involve optical radiation. Protection from both hazards shall be provided.	Protectors that do not provide protection from side exposure. Use of faceshields alone, without spectacles or goggles.
Hot Sparks	Goggles, spectacles: B, C, D, E, F, G, H, I, J, K, L. For severe exposure add N. Respirators R, T.		
Splash from molten metals	Faceshields worn over goggles H, K. Respirators R, T or S, U if optical radiation hazard exists.		
High temperature exposure	Screen faceshields, Reflective faceshields over spectacles or goggles.		
CHEMICAL			
Acid and chemicals handling, degreasing, plating. Splash and irritating mists.	Indirect vented: goggles, eyecup and cover types: G, H, K. For severe exposure add N. Respirators R, T. Irritating Mist: Special purpose goggles: G. Cover goggle – No ventilation. Respirators R, T.	Provides protection from splash entry with adequate ventilation. Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleaning may be required.	Spectacles, welding, helmets, or handshields.
DUST			
Woodworking, buffing, general dusty conditions. Nuisance dust	Goggles, eyecup and cover types: G, H, K. Respirators R, T.	Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleaning may be required.	

APPENDIX TABLE 1
EYE AND FACE PROTECTOR SELECTION

This guide is not intended to be the sole reference in selecting the proper eye and face protector.

Care shall be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of the hazards must be provided.

ACTIVITY AND ASSESSMENT	PROTECTOR CATEGORY AND STYLES		LIMITATIONS	NOT RECOMMENDED
OPTICAL RADIATION				
WELDING: Electric Arc	Note: Welding helmets or handshields shall be used only over spectacles or goggles.		Protection from optical radiation is directly related to filter lens density. Select the darkest shade that allows adequate tasks performance.	Protectors that do not provide protection from optical radiation.
Viewing electric arc furnaces and boilers	TYPICAL FILTER LENS SHADE: 10-14	PROTECTORS: Welding helmets or Welding Shields: O, P, Q Respirators S, U	Note: Filter lenses shall meet the requirements for shade designations in GI Part 33 Table 1.	Note: Filter lenses shall meet the requirements for shade designations in GI Part 33 Table 1.
WELDING: Gas, and viewing gas-fired furnaces and boilers	TYPICAL FILTER LENS SHADE: 4-8	PROTECTORS: Welding goggles, Helmets. Welding Face shields over spectacles or goggles: J, K, L, M, N, O, P, Q or Respirators S, U.	Note: Faceshields and welding helmets shall only be worn over spectacles or goggles.	Use of welding helmets or faceshields alone, without spectacles or goggles.
CUTTING	TYPICAL FILTER LENS SHADE: 3-6	PROTECTORS: Welding goggles, Helmets. Welding face shields: J, K, L, M, N, O, P, Q or Respirators S, U		
TORCH BRAZING	TYPICAL FILTER LENS SHADE: 3-4	PROTECTORS: Welding goggles, Helmets. Welding face shields: J, K, L, M, N, O, P, Q or Respirators S, U		
TORCH SOLDERING	TYPICAL FILTER LENS SHADE: 1.5-3	PROTECTORS: Spectacles or Welding Faceshield over spectacles: B, C, D, E, F, N or Respirators S, U.		
GLARE	Spectacle: A, B, Faceshields N over spectacles or goggles.		Shaded or Special Purpose lenses, as suitable.	

APPENDIX FIGURE 1
EYE AND FACE PROTECTIVE DEVICES

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

A. Spectacle, No sideshield 	B. Spectacle, Half sideshield 	C. Spectacle, Full Sideshield 	D. Spectacle, Detachable Sideshield 	E. Spectacle, Non-Removable Lens 
F. Spectacle, Lift Front 	G. Cover Goggle, No Ventilation 	H. Cover Goggle, Indirect Ventilation 	I. Cover Goggle, Direct Ventilation 	J. Cup Goggle, Direct Ventilation 
K. Cup Goggle, Indirect Ventilation 	L. Spectacle, Headband Temple 	M. Cover Welding Goggle, Indirect Ventilation 	N. Faceshield 	O. Welding Helmet, hand Hold 
P. Welding Helmet, Stationary Window 	Q. Welding Helmet, Lift Front 	R. Respirator 		
S. Respirator 	T1. Respirator 		T2. Respirator 	U. Respirator 

(1) Care shall 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 must be provided.

(2) Operations involving heat may also involve optical radiation. Protection from both hazards shall be provided.

(3) Faceshields shall only be worn over primary eye protection.

(4) Filter lenses shall meet the requirements for shade designations in General Industry Safety Standard Part 33 “Personal Protective Equipment,” Table 1.

(5) Persons whose vision requires the use of prescription lenses shall wear either protective devices fitted with prescription lenses or protective devices designed to be worn over regular prescription eyewear.

(6) Wearers of contact lenses shall also be required to wear appropriate covering 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 protection devices in electrical hazard areas.

(8) Refer to Section 6.5 “Special Purpose Lenses” in ANSI Z-87.1 2003 edition, as adopted in R 408.40603.

(9) Welding helmets or handshields shall be used only over primary eye protection.

(10) Non-sideshield spectacles are available for frontal protection only.

9. SELECTION GUIDELINES FOR HEAD PROTECTION.

All head protection (helmets) is designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important.

Protective helmets are described by impact type and electrical class. All protective helmets shall meet either Type I or Type II requirements. All helmets shall be further classified as meeting Class G, Class E, or Class C electrical requirements. Helmets shall be classified as follows:

(a) Impact type protective helmets shall be as follows:

(i) Type I helmets are intended to reduce the force of impact resulting from a blow only to the top of the head.

(ii) Type II helmets are intended to reduce the force of impact resulting from a blow to the top or sides of the head.

(b) Electrical classes for protective helmets shall be as follows:

(i) Class G, General protective helmets are intended to reduce the danger of contact with low voltage conductors. Test samples shall be proof-tested at 2200 volts (phase to ground). This voltage is not intended as an indication of the voltage at which the helmets protects the wearer.

(ii) Class E, Electrical protective helmets are intended to reduce the danger of contact with higher voltage conductors. Test samples are proof-tested at 20,000 volts (phase to ground). This voltage is not intended as an indication of the voltage at which the helmet protects the wearer.

(iii) Class C, Conductive protective helmets are not intended to provide protection against contact with electrical hazards.

Where falling object hazards are present, helmets must be worn. Some examples include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors.

Some examples of occupations for which head protection should be routinely considered are:

Electricians.
Linemen.
Mechanics and repairers.
Plumbers and pipe fitters.
Assemblers.
Packers.
Wrappers.
Sawyers.
Welders.
Laborer.
Freight handlers.
Timber cutting and logging.
Stock handlers.
Warehouse laborer

10. SELECTION GUIDELINES FOR FOOT PROTECTION.

Safety shoes and boots which meet the American Society for Testing and Materials Standards ASTM F2412 “Standard Test Methods for Foot Protection,” 2005 edition, and ASTM F2413 “Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear,” 2005 Edition, that provide both impact and compression protection.

Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided, and in other special situations electrical conductive or insulating safety shoes would be appropriate.

Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped; and, for other activities where objects might fall onto the feet.

Safety shoes or boots with compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employee’s feet.

Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury.

Some occupations (not a complete list) for which foot protection should be routinely considered are:

Assemblers.
Carpenters.
Craters.
Drywall installers and lathers.
Electricians.
Freight handlers.
Gardeners and grounds- keepers.
Laborers.
Machinists.
Mechanics and repairers.
Packers.
Plumbers and pipe fitters.
Punch and stamping press operators.
Sawyers.
Shipping and receiving clerks.
Stock clerks.
Stock handlers and warehouse laborers.
Structural metal workers.
Timber cutting and logging workers.
Welders.
Wrappers.

11. SELECTION GUIDELINES FOR HAND PROTECTION.

Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. MIOSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.

It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated; e.g., chemical hazards, cut hazards, flame hazards, etc. These performance characteristics should be assessed by using standard test procedures.

Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated. Other factors to be considered for glove selection in general include:

(A) As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types; and,

(B) The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure of the hazard, and the physical stresses that will be applied.

With respect to selection of gloves for protection against chemical hazards:

(A) The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects;

(B) Generally, any “chemical resistant” glove can be used for dry powders;

(C) For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials; and,

(D) Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

12. CLEANING AND MAINTENANCE.

It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision.

Personal Protective Equipment (PPE) should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection. It is also important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.

APPENDIX C
CONSTRUCTION INDUSTRY THRESHOLD HEIGHTS REQUIRING
FALL PREVENTION/PROTECTION EQUIPMENT
Updated May 24, 2016

This chart provides a breakdown of the fall protection requirements of construction standards.
Check to see if specific rules relate to your industry or activities.
It's important that you look at the specific language in the standard.

CONDITION	THRESHOLD	METHOD	STANDARD AND RULE
All conditions except: • Scaffolds (Part 12) • Cranes and derricks (Part 10) • Aerial work platforms (Part 32) • Steel erection (Part 26) • Tunneling (Part 14) • Electric transmission and distribution (Part 16) • Stairways and ladders (Part 11) • Telecommunication (Part 30)	6 feet	Guardrail system, safety net system or personal fall arrest system	Part 45 Fall Protection 1926.501
All conditions except: • Guardrail systems on scaffolds (Part 12) • Stairways, stair rail systems, and hand rails (Part 11 and Part 21) • Personal climbing equipment	6 feet	Guardrail system, safety net system or personal fall arrest system	Part 45 Fall Protection Rule 1926.502
Employees in steel erection activity except: leading edge work in a controlled decking zone and initial connecting	15 feet	Guardrail system, safety net system, personal fall arrest system, positioning device system, or fall restraint system	Part 26 Steel Erection Rule R 408.42645
Employees in steel erection activity, initial connecting	2 stories or 30 feet, whichever is less.	Guardrail system, safety net system, personal fall arrest system, positioning device system, or fall restraint system	Part 26 Steel Erection Rule R 408.42646
Employees in steel erection activity, leading edge work in a controlled decking zone	2 stories or 30 feet, whichever is less.	Guardrail system, safety net system, personal fall arrest system, positioning device system, or fall restraint system	Part 26 Steel Erection Rule R 408.42648
Employees working in a boom-supported or truck-mounted aerial work platform	No minimum	Personal fall arrest system or restraint system in addition to the standard guardrail system	Part 32 Aerial Work Platforms Rule R 408.43214 (1) to (4)
Employees working on a scaffold, 10 feet or more above the floor or ground	10 feet	Guardrail system and/or personal fall arrest system	Part 12 Scaffolds and Scaffold Platforms Rule R 408.41213

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CONDITION	THRESHOLD	METHOD	STANDARD AND RULE
Employees working on stairways	4 risers or 30 inches, whichever is less.	Stair rails and/or handrails	Part 21 Guarding of Walking and Working Areas Rule R 408.42155 and R 408.42156
Employees working on low pitched roofs (a roof having a slope less than or equal to 4 in 12, vertical to horizontal)	6 feet	Guardrail system, safety net systems, personal fall arrest systems, or a combination of these systems along with a warning line system and/or monitoring system	Part 45 Fall Protection Rule 1926.501
Employees using personal climbing equipment	No minimum	Lineman's belt and safety strap, safety net system	Part 16 Power Transmission and Distribution Rule 1926.954
Employees constructing electric transmission and distribution lines and equipment	No minimum	Lineman's belt, safety strap, lifelines, lanyards and personal climbing equipment	Part 16 Power Transmission and Distribution Rules 1926.954 (a) & (b)
Employees on a work platform suspended from a crane or derrick	No minimum	Guardrail system and personal fall arrest system	Part 10 Cranes and Derricks Rule R 408.41056 to R 408.41056i
Structural steel connectors riding the headache ball	No minimum	Positioning device system or personal fall arrest system	Part 28 Personnel Hoisting in Steel Erection Rule R 408.42809
Employees on a suspended work platform, working in a tunnel shaft or caisson	No minimum	In accordance with CS Part 10 Cranes and Derricks	Part 14 Tunnels, Shafts, Caissons and Cofferdams Rule R 408.41478
Employees working on telecommunication towers or poles	4 feet	Personal fall arrest system or positioning devise system	Part 30 Telecommunications Rule 1910.268(g)

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