



**DEPARTMENT OF ENERGY, LABOR AND ECONOMIC GROWTH**  
**DIRECTOR'S OFFICE**  
**GENERAL INDUSTRY SAFETY STANDARDS**

Filed with the Secretary of State on July 28, 1969 (as amended October 4, 1971)  
(as amended August 2, 1976) (as amended March 19, 1982)

These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the director of the department of consumer and industry services by sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended, and Executive Reorganization Order No. 1996-2, being §§408.1016, 408.1021, and 445.2001 of the Michigan Compiled Laws)

R 408.10703, R 408.10711 to R 408.10713, R 408.10715, R 408.10716, R 408.10721, R 408.10722, R 408.10725 to R 408.10727, R 408.10730, R 408.10731, R 408.10734, R 408.10741, R 408.10744, R 408.10753, R 408.10754, and R 408.10763 of the Michigan Administrative Code, appearing on pages 5201, 5203, 5205, 5206, and 5212 of the 1969 Annual Supplement to the Code, pages 5698 to 5700, 5702, 5703, and 5705 of the 1970-71 Annual Supplements to the Code, and page 8702 of the 1976 Annual Supplement to the Code, are amended to read as hereinafter set forth.

R 408.10714 and R 408.10757 of the Michigan Administrative Code, appearing on page 5201 of the 1969 Annual Supplement to the Code and page 5705 of the 1970-71 Annual Supplement to the Code, are rescinded.

**PART 7. GUARDS FOR POWER TRANSMISSION**

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**GENERAL PROVISIONS**

**R 408.10701. Scope.**

**Rule 701.** This part applies to all equipment used in the transmission of power, excluding the point of operation.

**R 408.10703. Definitions; B to G.**

**Rule 703.** (1) "Belt" includes any power transmission belt, including but not limited to, a flat belt, round belt, and V-belt, overhead chain and link belt. It does not include a conveyor belt.

(2) "Belt pole" means a device used in shifting belts on and off fixed pulleys on a line or countershaft if there are no loose pulleys.

(3) "Belt shifter" means a device for mechanically shifting belts from tight to loose idler pulleys or vice versa, or for shifting belts on cones of speed pulleys.

(4) "Exposed to contact" means that the location of an object is such that a person might come into contact with it and be injured.

(5) "Flywheel" includes a balance wheel and a flywheel pulley mounted and revolving on the crankshaft of an engine or other shafting.

(6) "Gears" means a set or train of wheels or parts that engages another part as by meshing teeth.

(7) "Guarded" or "enclosed" means that an object is covered, fenced, or surrounded so that it is not exposed to contact.

**R 408.10704. Definitions; H to V.**

**Rule 704.** (1) "Horizontal belt" means a bent running with a 60 degree angle from horizontal.

(2) "Maintenance runway" means a permanent runway or platform used for oiling, maintenance, running adjustment or repair work, but not for a passageway.

(3) "Nip-point belt and pulley guard" means a device which encloses a pulley and is provided with rounded or rolled edge slots through which the belt passes.

(4) "Point of operation" means that point at which cutting, shaping or forming by a machine is accomplished upon stock and other points that may offer a hazard to the operator in inserting or manipulating stock in the operation of the machine.

(5) "Securely fastened" means that the safety device or object referred to shall be so secured in place that it cannot be moved under normal or reasonably foreseen conditions or circumstances.

(6) "Vertical belt" means a belt running within a 30 degree angle from vertical.

## POWER TRANSMISSION EQUIPMENT

### R 408.10711. Flywheels.

**Rule 711.** Any part of a flywheel 7 feet or less above the floor or platform shall be guarded in 1 of the following ways:

- (a) Enclosed by a construction pursuant to R 408.10751 to R 408.10754.
- (b) With standard barriers and toeboards placed not less than 15, nor more than 20, inches from the rim of the flywheel pursuant to rule 231 and subrule (2) of rule 233 of the general industry safety standards commission standard, Part 2. Floor and Wall Openings, Stairways, and Skylights, being R 408.10231 and R 408.10233(2) of the Michigan Administrative Code.
- (c) The upper rim of a flywheel protruding through a working floor shall be enclosed or surrounded by a standard barrier and toeboard pursuant to rule 231 and subrule (2) of the rule 233 of the general industry safety standards commission standard, Part 2. Floor and Wall Openings, Stairways, and Skylights, being R 408.10231 and R 408.10233(2) of the Michigan Administrative Code.
- (d) A flywheel with a smooth rim 5 feet or less in diameter may be guarded pursuant to R 408.10756.

### R 408.10712. Cranks and connecting rods.

**Rule 712.** A crank and a connecting rod, if exposed to contact, shall be guarded pursuant to R 408.10751 to R 408.10754 or by a standard barrier pursuant to rule 231 of the general industry safety standards commission standard, Part 2. Floor and Wall Openings, Stairways, and Skylights, being R 408.10231 of the Michigan Administrative Code.

### R 408.10713. Tail rods and extension piston rods.

**Rule 713.** Tail rods and extension piston rods exposed to contact shall be guarded pursuant to R 408.10751 to R 408.10754 or by a standard barrier pursuant to rule 231 of the general industry safety standards commission standard, Part 2. Floor and Wall Openings, Stairways, and Skylights, being R 408.10231 of the Michigan Administrative Code, which allows a clearance of not less than 15, nor more than 20, inches from the fully extended tail rod or extension piston rod.

### R 408.10715. Discharge or exhaust pipes.

**Rule 715.** The discharge of an exhaust pipe or boiler blowoff, if exposed to contact, shall be guarded pursuant to R 408.10751 to R 408.10754.

### R 408.10716. Revolving and reciprocating parts.

**Rule 716.** A revolving or reciprocating part, if exposed to contact, shall be guarded pursuant to R 408.10751 to R 408.10754.

### R 408.10721. Shafts.

**Rule 721.** (1) A continuous line of shafting shall be secured in position against endwise movement.

(2) An inclined or vertical shaft shall be held in position against endwise thrust.

(3) A projecting shaft end, if exposed to contact, shall be made flush or guarded pursuant to R 408.10751 to R 408.10754.

### R 408.10722. Shafting.

**Rule 722.** (1) Shafting exposed to contact 7 feet or less above a floor or platform level shall be guarded pursuant to R 408.10751 to R 408.10754.

(2) Horizontal shafting extending over a driveway shall be guarded with a trough guard unless it is located 15 feet or more above the driveway, or is a part of an overhead traveling crane.

(3) Horizontal transmission shafting exposed to contact under benches shall be guarded in 1 of the following ways:

- (a) Be completely enclosed.
- (b) Be guarded by a trough guard. The sides of the trough shall come to the underside of the table or, if the shafting is located near a floor, to the floor.
- (c) Be guarded on exposed sides with a rigid shield guard extending from the underside of the bench top to 2 inches below the line of shafting.

### R 408.10725. Pulley guards and guides.

**Rule 725.** (1) A pulley and a pulley part exposed to contact 7 feet or less from the floor or platform shall be guarded pursuant to R 408.10751 to R 408.10754.

(2) If the distance from a pulley to the nearest fixed pulley, clutch, or hanger is less than the width of the belt used, a guide shall be provided to prevent the belt from leaving the pulley.

(3) If there is an overhanging pulley on a line, jack, or countershaft with no bearing between the pulley and the outer end of the shaft, a guide to prevent the belt from running off the pulley shall be provided.

### R 408.10726. Pulley condition and operation.

**Rule 726.** (1) A pulley with a defect, including, but not limited to, a crack or a piece broken out, shall not be used.

(2) A pulley subject to active corrosive conditions shall be of corrosion-resisting material.

(3) A pulley permanently out of service shall not be allowed to remain on shafting which is in use, unless enclosed with a guard pursuant to R 408.10751 to R 408.10754.

(4) A pulley shall not be operated at more than its designed rim speed.

### R 408.10727. Belts.

**Rule 727.** (1) A belt and pulley which is 7 feet or less above the floor or platform and which is exposed to contact shall be guarded pursuant to R 408.10751 to R 408.10754.

In a power plant or power-development room, a standard barrier and toeboard may be used pursuant to rule 231 and subrule (2) of rule 233 of the general industry safety standards commission standard, Part 2. Floor and Wall Openings, Stairways, and Skylights, being R 408.10231 and R 408.10233(2) of the Michigan Administrative Code.

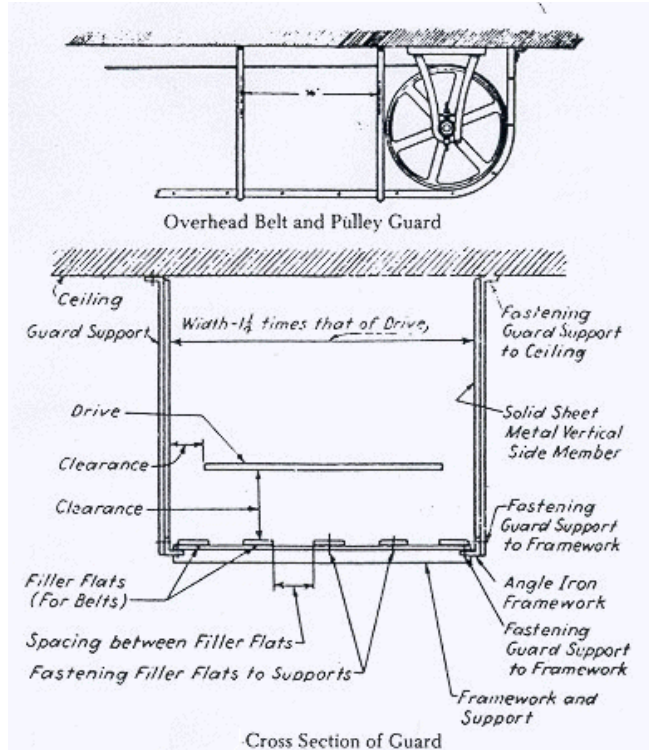
(2) A horizontal belt more than 7 feet above the floor or platform shall be guarded for its entire length if located over a passageway or work place pursuant to R 408.10753 and figure 2.

(3) A passageway between horizontal belts shall have a lower run guarded by a platform which is provided with a standard barrier and toeboard pursuant to rule 231 and subrule (2) of rule 233 of the general industry safety standards commission standard, Part 2. Floor and Wall Openings, Stairways, and Skylights, being R 408.10231 and R 408.10233(2) of the Michigan Administrative Code, and the upper run guarded pursuant to R 408.10727(2).

(4) A vertical or inclined belt running over a lower pulley more than 7 feet above the floor or platform and located over a passageway or work place shall be guarded pursuant to R 408.10727(2).

(5) Figure 2 reads as follows:

FIGURE 2



#### R 408.10729. Cone pulley belts.

**Rule 729.** (1) A cone belt and pulley shall be equipped with a belt shifter so constructed as to adequately guard the nip-point of the belt and pulley. If the frame of the belt shifter does not adequately guard the nip-point of the belt and pulley, the nip-point shall be further protected by means of a guard which extends at least to the top of the largest step of the cone.

(2) If the belt is of the endless type or laced with rawhide laces, and a belt shifter is not desired, the belt will be considered guarded if the nip-point of the belt and pulley is protected by a nip-point guard which extends at least to the top of the largest step of the cone, and formed to show the contour of the one in order to give the nip-point of the belt and pulley the maximum protection.

(3) If the cone is located less than 3 feet from the floor or working platform, the cone pulley and belt shall be guarded to a height of 3 feet regardless of whether the belt is endless or laced with rawhide.

#### R 408.10730. Belt tighteners and counterweights.

**Rule 730.** (1) A suspended counter balanced belt tightener and its parts shall be provided with a safety cable or device to prevent the tightener from being exposed to contact if the belt breaks or they shall be guarded pursuant to R 408.10751 to R 408.10754.

(2) A suspended counterweight exposed to contact or a part of a counterweight which could subject an employee to injury shall be guarded pursuant to R 408.10751 to R 408.10754 or shall be provided with a safety cable or device to prevent a fall.

#### R 408.10731. Gears, sprockets, and chain drives.

**Rule 731.** (1) Gears, sprockets, and chain drives exposed to contact shall be guarded pursuant to R 408.10751 to R 408.10754. This does not apply to hand-operated gear sprockets and chain drives used to adjust machine parts which do not move after hand power is removed.

(2) Protection against falling chain or metal belts shall be provided pursuant to R 408.10751 to R 408.10754 where drives extend over a work area or passageway.

#### R 408.10732. Openings for oiling.

**Rule 732.** If frequent oiling is necessary, openings with hinged or sliding self-closing covers shall be provided. Points not readily accessible shall have remote lubricating means if the lubricant is to be added while machinery is in motion and the oiler would be exposed to contact.

#### R 408.10734. Friction drives.

**Rule 734.** The driving points and moving parts of friction drives, if exposed to contact, shall be guarded pursuant to R 408.10751 to R 408.10754.

#### R 408.10736. Projections.

**Rule 736.** Projecting keys, set screws and other projections in revolving parts exposed to contact, shall be removed, made flush or guarded. This does not apply to keys or set screws within gear or sprocket casings or other enclosures, nor to keys, set screws or oil cups in hubs of pulleys less than 20 inches in diameter if they are within the plane of the rim of the pulley.

### STARTING AND STOPPING DEVICES

#### R 408.10741. Clutches.

**Rule 741.** (1) A clutch, cut-off coupling, or clutch pulley having any projecting parts exposed to contact shall be enclosed by a stationary guard constructed pursuant to R 408.10751 to R 408.10754.

(2) On a line shaft the shifting part of a jaw clutch and the shifting or mechanism part of a friction clutch coupling shall be attached to the driven shaft.

#### R 408.10743. Belt shifters.

**Rule 743.** (1) A tight pulley and a loose pulley shall be equipped with a permanent belt shifter provided with mechanical means to prevent the belt from creeping from the loose to the tight pulley.

(2) A belt shifter and clutch handle shall be rounded and be located to prevent being exposed to contact, but within easy reach of the operator. If an overhead belt shifter is not directly located over a machine or bench, the handles shall be cut off 7 feet above floor level.

#### R 408.10744. Belt poles, perches, and fasteners.

**Rule 744.** (1) If loose pulleys or idlers are not practicable, belt perches in the form of brackets and rollers shall be used to keep idle belts away from the shafts.

(2) Belts shifted by hand shall be glued or fastened with leather lacing.

## GUARD DESIGN AND CONSTRUCTION

### R 408.10751. Design.

**Rule 751.** (1) The design of a guard shall take into consideration:

- The nature of protection required of the guard.
- The possibility of guard failure.
- The amount of maintenance required on the guard.

(2) In a place where it is necessary to change belts, make adjustments or apply oil or grease, a guard may have hinged sections or be of a removable design. A guard shall be closed or replaced after servicing.

### R 408.10752. Construction.

**Rule 752.** A guard shall be practicable, durable and effective, and it shall not introduce a new hazard including but not limited to burrs and sharp edges.

### R 408.10753. Materials.

**Rule 753.** (1) Wood guards may be used if the presence of fumes or if manufacturing conditions cause rapid deterioration of metal guards, in construction work, and in locations outdoors if extreme cold or extreme heat makes metal guards and railings undesirable.

(2) Material sizes and clearances shall be pursuant to table A. See Figures 2, 3, and 4.

(3) Table A reads as follows:

TABLE A

STANDARD MATERIALS AND DIMENSIONS  
FOR MACHINERY GUARDS

Size and Clearance of Filler Materials			
Material	Clearance From Moving Part At All Points (Inches)	Largest Mesh or Opening Allowable B (Inches)	Minimum Gauge (U.S. Standard) Or Thickness
Woven Wire	Under 2 2-4 4-15	3/8 1/2 2	No. 16-3/4 In. No. 16-1/2 No. 12-2
Expanded Metal	Under 4 4-15	1/2 2	No. 18-1/2 In. No.13-2
Perforated Metal	Under 4 4-15	1/2 2	No. 20-1/2 In. No. 14-2
Sheet Metal	Under 4 4-15	- - -	No. 22 No. 22
Wood Or Metal Strips Crossed	} Under 4 4-15	3/8 2	} 3/4 In. Wood Or No. 16 Metal
Wood Or Metal Strips Not Crossed			
Plywood, Plastic Or Equivalent	Under 4 4-15	- - -	1/4 In. 1/4 In.
Standard Railing	Min.15 Max. 20	- - -	- - -

### R 408.10754. Frames.

**Rule 754.** (1) If a guard has a frame, the material shall be securely fastened to it.

(2) The minimum dimensions of materials in the frame of a guard shall be of sufficient strength and rigidity to hold the filler material fastened to it and to give sufficient strength and rigidity in order to provide the desired protection.

### R 408.10756. Disk guards.

**Rule 756.** A disk guard shall be made of materials specified in table A of rule 753 and fastened securely to spokes of pulleys, flywheels or gears. If a possibility of contact with sharp edges of the disk exists, the edge shall be rolled. Lock nuts or washers shall be placed on the unexposed side of the wheel.

## POWER DISCONNECTS AND LOCK-OUTS

### R 408.10761. Stopping devices.

**Rule 761.** (1) A machine shall be equipped with a stopping device when can be safely actuated from the operator's working position. Such a device may stop the entire machine operation or only that part of the machine at point of operation. The machine shall be restarted only after an assurance that all employees are in the clear.

(2) Each machine simultaneously attended or operated by more than 1 employee shall be equipped with a machine power control for each employee exposed to point of operation hazards. These controls shall be interlocked in a manner to prevent operation of the machine, until each employee actuates his control.

(3) A machine power control shall be designed and installed to prevent operation by accidental contact with objects or parts of the body and maintained in good operating condition.

### R 408.10763. Machine power disconnects.

**Rule 763.** A machine shall be equipped with means to permit the disconnecting of its source of power while persons are performing maintenance or making adjustments or repairs.

### R 408.10765. Inspection and care of equipment; clothing for oilers.

**Rule 765.** (1) All power-transmission equipment shall be inspected at intervals not exceeding 60 days and be kept in good working condition at all times.

(2) Shafting shall be kept in alignment, free from rust and excess oil or grease.

(3) Where explosives, explosive dusts, flammable vapors, or flammable liquids exist, the hazard of static sparks from shafting shall be carefully considered.

(4) Bearings shall be kept in alignment and properly adjusted.

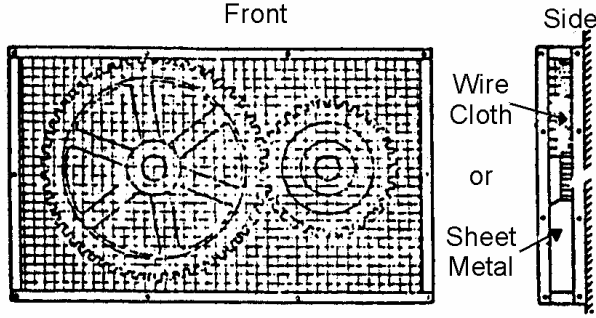
(5) Hangers shall be inspected to make certain that all supporting bolts and screws are tight and that supports of hangers boxes are adjusted properly.

(6) Pulleys shall be kept in proper alignment to prevent belts from running off.

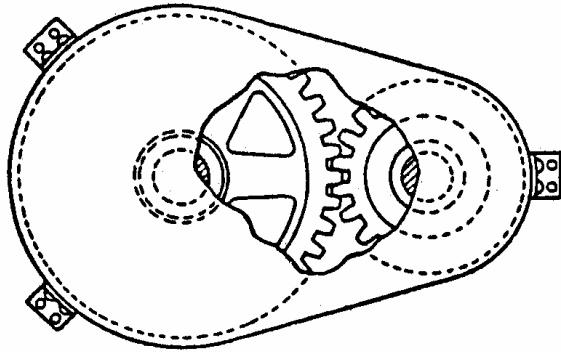
(7) Inspection shall be made of belts, lacings, and fasteners, and such equipment shall be kept in good repair.

(8) The oilers shall wear clothing appropriate to the hazard.

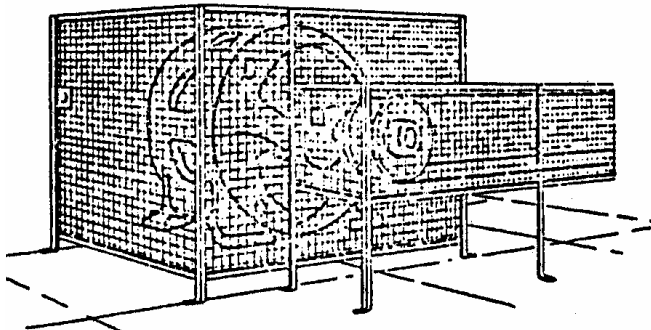
FIGURE 3  
GUARD CONSTRUCTION



GEAR GUARD WITH WIRE CLOTH FILLER

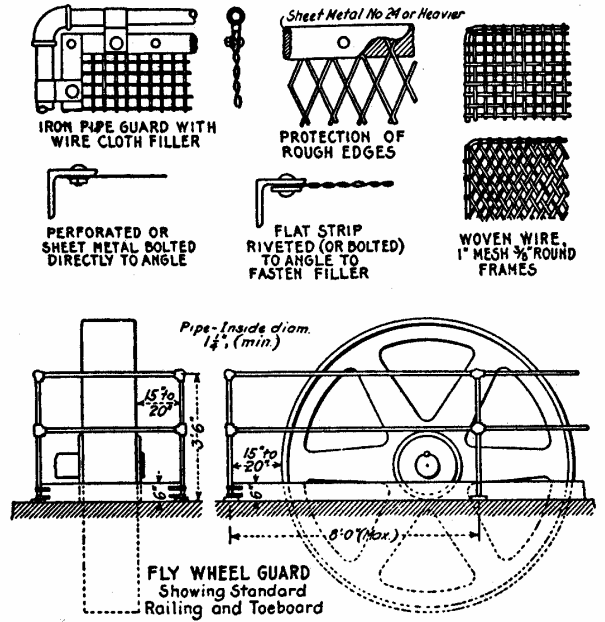


GEAR GUARD OF SHEET METAL



MOTOR AND LOW BELT ENCASED

FIGURE 4



Acceptable Guard Construction.



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