DEPARTMENT OF LABOR AND ECONOMIC OPPORTUNITY

DIRECTOR'S OFFICE

GENERAL INDUSTRY SAFETY AND HEALTH STANDARD

(By authority conferred on the director of the department of labor and economic opportunity by sections 16 and 21 of the Michigan occupational safety and health act, 1974 PA 154, MCL 408.1016 and 408.1021, and Executive Reorganization Order Nos. 1996-2, 2003-1, 2008-4, 2011-4, and 2019-3, MCL 445.2001, 445.2011, 445.2025, 445.2030, and 125.1998)

PART 62. PLASTIC MOLDING

R 408.16201 Scope.

Rule 6201. (1) This part sets forth safe practices for employees and safeguards for all machinery and equipment used in the following areas of plastics processing:

(a) Blow molding.
(b) Foam molding.
(c) Compression and transfer molding.
(d) Injection molding.
(e) Extrusion.
(f) Expansion molding.
(g) Rotational molding.
(h) Vacuum molding.
(i) Sealing.
(j) Heating.
(k) Granulating.
(l) Welding.

(2) The process of blister, skin, or shrink packaging is not subject to the requirements of these rules.

History: 1979 AC; 1992 AACS.

R 408.16202 Referenced standards.

Rule 6202. The following Michigan Occupational Safety and Health Administration (MIOSHA) standards are referenced in these rules. Up to 5 copies of these standards may be obtained at no charge from the Michigan Department of Labor and Economic Opportunity, MIOSHA Regulatory Services Section, 530 West Allegan Street, P.O. Box 30643, Lansing, Michigan, 48909-8143 or via the internet at the following website: www.michigan.gov/mioshastandards. For quantities greater than 5, the cost, at the time of adoption of these rules, is 4 cents per page.

(a) General Industry Safety and Health Standard Part 2. “Walking-Working Surfaces,” R 408.10201 to R 408.10241.

(b) General Industry Safety Standard Part 85. “The Control of Hazardous Energy Sources,” R 408.18501 to R 408.18599.

History: 2015 AACS; 2019 AACS; 2021 AACS.

R 408.16204 Definitions; B to E.

Rule 6204. (1) "Blow molding machine" means a plasticizer and a clamping unit that work in conjunction with each other so that the plasticizer produces molten plastic which is blown by air, gas, or liquid and the clamping unit performs the manufacture of hollow products.

(2) "Compression molding machine" means a machine that uses temperature-controlled molds for pressing plastic material into the shape of a mold cavity.

(3) "Device" means a machine control that is designed and installed to perform either of the following functions:

(a) Prevent normal machine operation if the operator's hands are within the point of operation.

(b) Require the concurrent use of both hands of the operator to actuate the machine.

(4) "Dielectric sealing" means a process for bonding plastic films using high-frequency energy.

(5) "Expansion molding" means to make plastic shapes by expanding polystyrene beads with a heating medium within a mold.

(6) "Extrusion machine" means a plasticizer which is mounted on a base and which takes raw plastic material, changes it into a molten state, and extrudes it through a die into a predetermined shape.

History: 1979 AC; 1992 AACS; 2015 AACS.

R 408.16205 Definitions; H, I.

Rule 6205. (1) "Heat sealing" means the joining of plastic by simultaneous application of heat and pressure to the area of contact.

(2) "Hot plate welding" means the joining of plastic by preheating followed by application of pressure to the plastic pieces.

(3) "Hot-wire cutter" means a machine using electrically resistant wire for heating, spaced at intervals to cut expanded plastic blocks into predetermined sizes.

(4) "Injection molding machine" means a machine using a plasticizer to force a charge of processed plastic material into a closed mold, which produces a molded part.

History: 1979 AC.

R 408.16206 Definitions; M to Q.

Rule 6206. (1) "Matched metal molding" means a method of molding reinforced plastics between 2 close-fitting metal molds mounted in a power press.

(2) "Nip point" means a point at which it is possible to be caught between 2 or more shafts or rolls that rotate parallel to each other in opposite directions.

(3) "Operator" means any employee who is assigned to operate or anyone who comes around plastic processing equipment and who is exposed to the point of operation.

(4) "Pinch point" means a point at which it is possible for an employee to be caught between moving parts of a machine or between moving and stationary parts of a machine.

(5) "Plastic scrap granulator" means a machine that has rotating knives which cut plastic articles into particles.

(6) "Point of operation" means the area of a machine where material is actually worked.

(7) "Qualified person" means one who, by knowledge, training, and experience, has successfully demonstrated, to the employer, his or her ability to solve or resolve problems relating to the subject matter, the work, or the project.

History: 1979 AC; 1992 AACS.

R 408.16207 Definitions; R, S.

Rule 6207. (1) "Rotational molding" means a method of making hollow articles by charging a hollow rotating mold with a plastic material. After the heated material covers all surfaces of the mold it is cooled and stripped out.

(2) "Safety factor" means the ratio of the breaking strength of a piece of material or object to the maximum designed load or stress applied when in use.

(3) “Safety gate” means a moveable, interlocked guard allowing the operator access to the point of operation to perform production related tasks.

(4) "Ship-lap machine" means a powered machine equipped with feed rolls and milling cutters for the purpose of cutting grooves in the edge of expanded sheet material.

(5) "Spin welding" means a method of fusing 2 objects together by spinning 1 or both until frictional heat melts the interface. The spinning is then stopped and pressure applied to both objects.

History: 1979 AC; 2021 AACS.

R 408.16208 Definitions; T to V.

Rule 6208. (1) "Transfer molding machine," also known as a plunger molding machine, means an auxiliary chamber used to heat plastic to a hot state before transferring it into a closed mold of a compression molding machine.

(2) "Transfer printer" means a machine with rolls which imprints a pattern on material run between the rolls.

(3) "Two-hand controls" means an actuating device with an anti-tie down, anti-repeat feature that requires the concurrent use of both hands of an operator to actuate a machine.

(4) "Ultrasonic welding" means to seal plastic by application of vibratory mechanical pressure which creates localized heat to melt the plastic surfaces which effects the seal.

(5) "Vacuum forming," also known as thermo forming, means forming of pliable sheet plastic into shapes by use of molds and atmospheric or mechanical pressure.

History: 1979 AC.

R 408.16211 Employer responsibilities.

Rule 6211. (1) An employer shall provide training to an employee regarding the operating procedures, hazards, and safeguards of any assigned job.

(2) An employer shall not allow a machine to be operated if the machine is not guarded as prescribed by this part or has a known defect that could affect the safety of an employee.

(3) An employer shall ensure that all safety devices are checked and found to be functional and properly adjusted.

History: 1979 AC; 2013 AACS; 2021 AACS.

R 408.16212 Employee responsibilities.

Rule 6212. (1) An employee shall not operate a machine until he has been trained in its operating procedures, hazards and safeguards and has been authorized to do so.

(2) An employee shall report to his supervisor a machine or safeguard which is defective.

(3) A guard removed for inspection, maintenance, die setting or mold setting shall be replaced before a machine is released for production.

History: 1979 AC.

R 408.16215 Illumination.

Rule 6215. Illumination of not less than 25 footcandles shall be provided at an operator's work station.

History: 1979 AC.

R 408.16216 Aisles and work areas.

Rule 6216. An aisle or work area shall be kept free of protruding objects, holes, loose boards, oil and water spillage which create a tripping and slipping hazard.

History: 1979 AC.

R 408.16217 Rescinded.

History: 1979 AC; 2013 AACS.

EQUIPMENT INSTALLATION AND MAINTENANCE

R 408.16221 Machine installation.

Rule 6221. (1) An electrically powered machine shall be grounded.

(2) A machine installed on a bench, table or stand shall be designed or secured to prevent unintentional movement or tipping.

(3) A machine shall be so located that there will be space for the employee to handle the material and operate the machine with no interference to or from another employee or machine.

(4) A machine shall be so located that it will not be necessary for an operator to stand in an aisle.

(5) A powered gate shall have the leading edge equipped with a return switch and circuit so designed that the gate will retract and not cause an injury if an employee is struck by it.

History: 1979 AC.

R 408.16222 Devices, guards, and protective equipment

Rule 6222. (1) An electrical connection to a heated portion of a ram or screw cylinder shall be covered with a nonconducting guard or a grounded metal barrier to prevent contact with live terminals during normal operation of the machine.

(2) An exposed heated surface which could cause an injury shall be covered or guarded to prevent contact by an employee. This subrule does not apply to an area that requires accessibility, such as the adapter or grate on an extrusion machine.

(3) A machine that uses a blade or knife to cut plastic materials shall be guarded by a barrier, by position, or by a device to prevent contact between the operator and the machine.

History: 1979 AC; 1983 AACS; 1992 AACS; 2013 AACS.

R 408.16223 Rescinded.

History: 1979 AC; 1992 AACS; 2015 AACS; 2019 AACS; 2021 AACS.

R 408.16224 Hydraulic and pneumatic systems; safety factors.

Rule 6224. Flexible and rigid hydraulic and pneumatic piping and its component parts shall be designed and constructed with a safety factor of not less than 4.

History: 1979 AC.

R 408.16225 Point of operation devices.

Rule 6225. (1) Either of the following point of operation devices shall protect an operator:

(a) A device that prevents or stops, or both, the normal machine function if the operator's hands are within the point of operation.

(b) A device that requires the application of both of the operator's hands to the machine operating controls until a point is reached in the cycle where the operator cannot remove a hand and place it within a pinch point or point of operation. Sweep guards are not acceptable as a device to protect the operator.

(2) If a presence-sensing point of operation device is used, it shall protect the operator as provided in subrule (1)(a) of this rule and shall be interlocked into the control circuit to prevent or stop motion if the operator's hand or other part of his or her body is within the sensing field of the device during the closing cycle of the machine. The device shall not be used to initiate operation of the machine and shall be in compliance with all of the following provisions:

(a) The device shall be constructed so that a failure within the device initiates a stopping action and prevents the initiation of a successive cycle until the failure is corrected. The failure shall be indicated by the system.

(b) The distance from the sensing field to the point of operation shall be such so as to permit the mold or die to close or stop before the employee can reach into the point of operation with any body part.

(c) Safety guards shall be used to protect an employee from all hazardous motion which is not protected by the presence-sensing device.

The protection function of a presence-sensing point of operation device may be bypassed for the purposes of parts ejection, circuit checking, and feeding as the mold or die opens if the operator is not exposed to hazardous motion.

History: 1992 AACS.

R 408.16226 Controls.

Rule 6226. (1) An operating control shall be guarded against accidental contact. A control button or lever shall be identified as to its function.

(2) If a machine requires more than 1 operator, and if each operator is exposed to a point of operation, the controls shall be activated concurrently before the machine will operate.

(3) A machine shall be provided with an emergency stop control at each operator station. The stop control shall be red in color and readily accessible. A button, if used, shall have a mushroom shape.

(4) A machine shall be provided with a means that, upon power failure, will prevent automatic restarting upon the restoration of power. Fire, coolant, and sump pumps are excepted from the requirements of this subrule.

(5) When used, interlocks shall be installed to minimize the possibility of accidental operation or tampering.

(6) Where more than 1 operator is assigned to a plastic molding machine that is not equipped with interlocked gates and the operator is exposed to a point of operation, or when hazardous motion in or near the point of operation could cause injury, each operator shall be provided with a device that prevents reaching into the point of operation during the closing cycle.

(7) Two-hand control devices shall be located in a manner to prevent bridging.

History: 1979 AC; 1992 AACS; 2021 AACS.

R 408.16227 Rescinded.

History: 1979 AC; 1998-2000 AACS; 2013 AACS; 2015 AACS; 2021 AACS.

SPECIFIC EQUIPMENT

R 408.16231 Blow molding.

Rule 6231. (1) A blow molding machine shall be equipped with a safety gate that is designed and constructed to prevent an employee from reaching into the point of operation when the gate is in a closed position.

(2) A safety gate shall activate, at its final closing, at least 1 electrical control which shall be part of the electrical mold-closing circuit. Opening or removing the gate shall prevent further closing of the mold.

(3) A safety gate shall also be directly interlocked with a hydraulic or pneumatic valve that controls mold closing or have a mechanical means which will prevent movement of the machine with the gate open or removed.

History: 1979 AC; 1992 AACS.

R 408.16232 Compression, transfer, and matched metal molding machinery.

Rule 6232. (1) A compression, transfer, or matched metal molding machine shall be equipped with either of the following:

(a) A moving gate guard that covers the front opening to the point of operation. An electric interlock on the moving gate guard shall be arranged to prevent the machine from closing until the moving gate guard has covered the opening. When the moving gate guard is opened, the machine shall stop or reverse.

(b) A device as prescribed by the provisions of R 408.16225.

(2) The point of operation for a machine that does not require access for an operator shall be guarded by an interlocked removable barrier or a fixed barrier. The toggles on such a machine shall also be enclosed by an interlocked removable or fixed barrier to prevent inadvertent contact by an employee.

(3) Two 2-hand control devices shall be provided and used when operating a transfer molding machine. One set shall close the mold and then the other set shall actuate the transfer plunger. Where the entrance to the plunger is guarded by an interlocked gate, 1 such control device is acceptable.

History: 1979 AC; 1992 AACS.

R 408.16233 Extrusion machinery and equipment.

Rule 6233. (1) An extrusion machine and floor model controller panel shall be secured to prevent tipping.

(2) When running production, the in-running nip points on a take-off machine pulling extrusions, except sheets, from the extruder shall be guarded by a barrier adjusted to within 1/4 inch of the material.

(3) When running production, sheet and film extrusion machinery shall be guarded by a barrier or enclosure at all in-running pinch points exposed to contact.

(4) An extrusion machine having an open feed screw shall have the feed screw covered by an interlocked gate or cover to prevent the operator from being caught in the point of operation.

History: 1979 AC.

R 408.16234 Injection molding machinery.

Rule 6234. (1) An injection molding machine, except for one with a movable table that is subject to the provisions of subrule (4) of this rule, shall be equipped with a safety gate or guard that is designed and constructed to prevent an employee from reaching into the point of operation, except when the gate is open.

(2) A horizontal injection molding machine shall have the safety gate interlocked to stop or prevent mold-closing by any 2 of the following:

(a) An electrical mold-closing control.

(b) Hydraulic or pneumatic valves that control mold closing.

(c) A mechanical device that prevents mold closing.

(d) A second electrical mold closing control (all electrical horizontal injection molding machines).

(3) A vertical clamp injection molding machine shall have a mechanical restraint device to prevent unintentional gravity descent of the mold, and shall have the safety gate interlocked to stop or prevent mold-closing by any 2 of the following:

(a) An electrical mold closing control.

(b) Hydraulic or pneumatic valves that control mold closing.

(c) A second electrical mold closing control (all electrical vertical injection molding machines).

(4) An injection molding machine that uses a movable table to hold the lower mold shall be provided with a guard or device that is designed and constructed to deny an operator access to the point of operation during machine cycle.

(5) An injection molding machine shall be equipped with a fixed or an interlocked movable or removable guard, or other device that is designed and constructed to prevent an employee from reaching into the clamping mechanism.

(6) When purging an injection molding machine, an employee shall be protected from the purging splatter by a shield that is fixed, portable, or worn on the employee. The same shielding shall be used when servicing a heated runner manifold nozzle.

(7) An injection molding machine that uses an extruding machine that has an exposed feed screw shall have the screw guarded as prescribed by R 408.16233(4).

(8) Employers engaged in mold changes on injection molding machines shall comply with General Industry Safety Standard Part 85. “The Control of Hazardous Energy Sources,” (Lockout/Tagout), as referenced in R 408.16202.

History: 1979 AC; 1992 AACS; 1998-2000 AACS; 2015 AACS; 2021 AACS.

R 408.16235 Expansion molding.

Rule 6235. (1) A shiplap machine shall have the milling cutters guarded or enclosed at the point of operation to prevent contact with the operator's fingers. A barrier shall be

provided in front of the in-running nip points of the feed rollers to within 3/8 of an inch of the material.

(2) A multiple hot-wire cutter shall have a manual control for setup use only. Any control for the automatic cycle shall be interlocked with the carriage so that the hot-wire cutter is activated before the carriage moves and is shut off when the carriage stops.

(3) A multiple hot-wire cutter shall be equipped on both sides of the moving portion of the machine with a barrier that is designed to prevent an employee from reaching the hot wires.

(4) An expansion block mold shall have reinforcements necessary to contain the force of the expanding plastic particles. Locking mechanisms shall not be more than 24 inches apart.

(5) A custom expansion block machine shall protect the operator by means of an interlocked gate across the mold parting line or by a device as prescribed by the provisions of R 408.16225. When the gate is opened or removed, the machine shall cease to function until the gate is closed.

History: 1979 AC; 1992 AACS.

R 408.16236 Vacuum and thermoforming

Rule 6236. (1) An in-line automatic vacuum forming or trim press that is used to form or die cut vacuum-formed pieces shall have the point of operation and all moving parts guarded that would otherwise be exposed to contact.

(2) A trim machine that uses a moving roll to supply pressure to the top die shall be provided with devices that are designed to keep both hands of the operator from the point of operation when the die closes.

(3) Toggles on an automatic vacuum or thermoforming press shall be guarded by a barrier to prevent access to the pinch point.

(4) A rotary vacuum forming machine shall be equipped with a 2-hand control device that is located and timed as prescribed by the provisions of R 408.16225(1)(b) and R 408.16226(7).

(5) Where a hazard exists due to movement or heating, the area below the level of the lower mold on a vacuum forming machine shall be guarded.

(6) An indexing machine shall be equipped with a stop control, such as a paddle switch, that is interlocked to stop the indexing operation. The stop control shall be located ahead of the first point of operation or pinch point beyond the work station.

History: 1979 AC; 1992 AACS; 2013 AACS.

R 408.16237 Rotational molding.

Rule 6237. (1) A pinch point created where the revolving drive wheel of a rotational molding machine meets the driving surface must be guarded.

(2) The perimeter of the path of travel of the rotating molds must be guarded in compliance with General Industry Safety and Health Standard Part 2. “Walking-Working Surfaces,” as referenced in R 408.16202. Access into the area must be by a gate or door. If the gate or door is interlocked to the power source, the guarding required in subrule (1) of

this rule need not be installed. The interlocked gate or door on the standard barrier must not be used as an operating control.

(3) A rotational molding machine that has each movement of the mold manually controlled by an operator may substitute a yellow line 4 inches wide for a standard barrier around the perimeter of the path of travel of the rotating molds, except the perimeter between the heating and cooling chambers. However, movement of the molds must be preceded by automatic activation of a warning device, such as a flashing light, bell, horn, or siren for 5 seconds before the movement.

(4) The operating controls for a manually operated machine must be so located that the operator cannot reach into the path of or be struck by the moving mold.

History: 1979 AC; 2015 AACS; 2019 AACS.

R 408.16241 Guillotine cutter.

Rule 6241. A guillotine plastic cutter shall have the cutter blade guarded on each side by a barrier constructed in such a manner to prevent contact with the cutter by the operator.

History: 1979 AC.

R 408.16242 Hopper filling methods.

Rule 6242. The method used to fill a hopper more than 5 feet above a floor or platform of a plasticizer shall be 1 of the following:

(a) A barrel dumper that is used with a hoist.

(b) A barrel dumper or an enclosed platform on a powered industrial truck.

(c) A portable stair that has handrails and wheel locks.

(d) A platform that is located not more than 5 feet below the hopper opening.

(e) An automatic feed system.

(f) Another method that does not expose the employee to a hazard.

History: 1979 AC; 1992 AACS.

R 408.16243 Processing plastic.

Rule 6243. (1) A heat-sealing machine shall be equipped with a device as prescribed by the provisions of R 408.16225.

(2) A punch press that is used for die cutting plastic shall be guarded as prescribed by the provisions of R 408.16236(2).

(3) A printing press that is used for die cutting shall be equipped with an effective device which restricts or removes the operator's hands from the point of operation at each closing.

(4) A machine that uses rotary cutters to cut and shape plastic shall have the point of operation enclosed.

History: 1979 AC; 1992 AACS.

R 408.16244 Transfer printer, crush and embossing rolls.

Rule 6244. The in-running rolls of a transfer printer, crush or embossing roll shall be guarded by a barrier which will prevent an operator from being caught in the nip point.

History: 1979 AC.

R 408.16245 Hot plate, spin, and ultrasonic welding machines; guards.

Rule 6245. (1) The point of operation on a hot plate, spin, or ultrasonic welding machine shall be guarded with either of the following:

(a) A movable interlocked gate or fixed barrier that is designed and constructed to prevent an employee from reaching into the point of operation, except when the gate is open.

(b) A device as prescribed by the provisions of R 408.16225.

(2) Moving parts of a hot plate, spin, or ultrasonic machine which create a pinch point shall be guarded as prescribed by the provisions of subrule (1)(a) of this rule.

(3) The heated plates of a hot plate welding machine shall be guarded against accidental contact when in a retracted position.

(4) A fixed barrier of solid material shall be installed on a spin welding machine if any of the following conditions exist:

(a) A rotating chuck continues to spin when in the retracted position.

(b) Flash is projected and the machine is guarded by a device.

(c) Fixed orientation is accomplished by an indexing mechanism.

History: 1979 AC; 1992 AACS.

R 408.16246 Dielectric sealing.

Rule 6246. (1) An electrical power pack or oscillator cabinet shall have the access doors interlocked in a manner which will cut the power when the doors are opened and shall have a mechanical shorting bar which will automatically ground out the residual energy.

(2) An employee shall be protected by an interlocked and grounded shield that is constructed to block the direct passage of the stray currents moving out of the intended path.

(3) The point of operation shall also be guarded as prescribed by the provisions of R 408.16245(1). The movable or fixed barrier and the shield required in subrule (2) of this rule may be the same if it accomplishes both purposes.

History: 1979 AC; 1992 AACS.

R 408.16247 Plastic scrap granulators.

Rule 6247. (1) The opening of a hopper of a plastic scrap granulator shall be of such distance from the cutting knives that the fingers of an employee cannot make contact. A baffle gate shall be installed at the feed entrance of a hopper so that the opening is normally closed except for charging with scrap.

(2) An access opening for maintenance, cleaning or inspection shall be covered with a solid plate, secured by a fastener which requires the use of a tool to unfasten it.

(3) Before a hopper is removed, a plastic scrap granulator shall have the power source disconnected and locked out.

History: 1979 AC.

R 408.16251 Rescinded.

History: 1979 AC; 1992 AACS; 2015 AACS; 2021 AACS.