

4123:1-7-01

Scope and definitions.

(A) Scope.

The purpose of this chapter of the Administrative Code is to provide reasonable safety for life, limb and health of employees. In cases of practical difficulty or unnecessary hardship, the Ohio bureau of workers' compensation may grant exceptions from the literal provisions of the rules of this chapter or permit the use of other devices or methods when, in the opinion of the bureau, equivalent protection is thereby secured.

The specific requirements of this chapter supplement those of Chapter 4123:1-5 of the Administrative Code, and are minimum requirements of an employer for the protection of such employer's employees and no others and apply to the manufacture of castings containing iron, steel, brass, copper, tin, zinc, lead, aluminum, or any of the baser metals, but do not apply to steel making or any processes used in conjunction with steel manufacturing and fabricating.

Installations or constructions built or contracted for prior to the effective date of any requirement shall be deemed to comply with the provisions of these requirements if such installations or constructions comply either with the provisions of these requirements or with the provisions of any applicable specific requirement which was in effect at the time contracted for or built.

(B) Definitions.

- (1) "Core" means a preformed sand aggregate inserted into a mold to shape the interior of a casting.
- (2) "Core box" means a wood, metal or plastic structure used to shape sand into a core.
- (3) "Crucible" means a ceramic pot or receptacle used in melting molten metal, transporting it or both.
- (4) "Cupola" means a cylindrical furnace lined with refractories for melting metal in direct contact with the fuel by forcing air under pressure through openings near its base.
- (5) "Factor of safety" means the ratio between the ultimate breaking stress and the working stress of the material, structure, or device. For example, the term "factor of safety of four" means the material, structure or device shall be

constructed of such strength that the maximum load will be one-fourth the designed ultimate breaking load. Where other factors of safety appear, they shall apply in the same manner. The standards of the "American Society for Testing Materials" shall be used in determining the strength of material except as otherwise provided herein.

- (6) "Flask" means the frame which holds the sand or other substance forming the mold.
- (7) "Gallery" means a corridorlike platform, passage or walkway, especially one projecting from a wall and open at the outer edge.
- (8) "Guard" means the covering, fencing, railing, or enclosure which shields an object from accidental contact.
- (9) "Guarded" means that the object is covered, fenced, railed, enclosed, or otherwise shielded from accidental contact.
- (10) "Ladle" means a metal receptacle frequently lined with refractories used for transporting and pouring molten metal.
- (11) "Mold" means the form into which molten metal is poured to produce a casting.
- (12) "Operator" means any employee assigned or authorized to work at the specific equipment.
- (13) "Passageway" means a well defined aisle, gangway, walkway, etc., used for movement of employees and equipment, but does not include the space between molds unless regularly used for such movement.
- (14) "Pig hole" means the opening into which the excess molten metal is poured.
- (15) "Pig mold" means a mold used to hold excess molten metal.
- (16) "Pouring floor or area" means the floor or area where molten metal is poured.
- (17) "Shall" is to be construed as mandatory.
- (18) "Substantial" means construction of such strength, of such materials, and of such workmanship that the object will withstand the wear, usage or shock for

which it is designed.

(19) "Trunnion" means the cylindrical metal support attached to the side of a ladle or flask.

(20) "Tumbling mill" means a rotating barrel in which castings are cleaned.

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4123:1-7-02

Floors and pits.

(A) General requirements.

- (1) All floors and pits where molten metal is handled shall be kept free from puddles of liquid.
- (2) Floors adjoining industrial tracks at the cross-over point shall be approximately flush with the top of the track rails.
- (3) Pig holes in the floor shall be guarded. Pig molds and receiving stations for excess molten metal from ladles shall be located in such a manner as to maintain a clear passageway.

(B) Ladle pits.

- (1) Pits for metal and slag ladles at melting equipment shall be kept clean and dry.
- (2) Ladle pits shall have no less than one foot of clearance over the greatest overall dimension of the ladle.
- (3) Employees shall not be required to be in pits used for metal or slag ladles while metal or slag is being poured into the ladle.

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4123:1-7-03

Galleries.

(A) Galleries where molten metal is poured into molds shall be:

(1) Provided with solid, leakproof floors, or

(2) Guarded to prevent access to the area below the pouring operation.

(B) Partitions of sheet steel no less than forty-two inches in height shall be installed on any open side of galleries described in paragraph (A) of this rule.

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4123:1-7-04 **Passageways.**

- (A) Passageways shall be sufficiently firm to withstand the travel for which they are intended, and shall be kept clear of obstructions.
- (B) Passageways shall be no less than twenty-four inches wide where no more than two employees manually carry molten metal.
- (C) Passageways shall be no less than five feet wide where more than two employees manually carry molten metal.
- (D) Passageways where molten metal is transported in truck, sulky, or manually operated monorail ladles shall be no less than twenty-four inches wider than the extreme width of such ladles.
- (E) Passageways used for parallel travel of truck ladles or manually operated monorail ladles shall be no less than twice the width required for a one-ladle operation.

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4123:1-7-05

Ladles.

(A) General.

- (1) Ladles shall be thoroughly dry before use.
- (2) Powered monorail ladles, cars, trucks and cranes used to transport molten metal ladles shall be equipped with audible or visual warning devices which shall be used whenever molten metal is being transported.
- (3) An audible or visual warning device shall be used when a manually operated monorail ladle, transporting molten metal, crosses an intersecting passageway.

(B) Tilting (lip-pouring) ladles.

- (1) Tilting ladles exceeding two thousand pounds capacity shall be of the gear-operated type.
- (2) All mechanically or electrically operated tilting ladles shall be equipped with a suitable locking device or brake to prevent overturning or uncontrolled sway.
- (3) The refractory rim or lip on hand or bull ladles shall be no more than one-half inch above the top of the metal shell, unless the refractory ladle lining is one and one-half inch thick or more at the rim, in which case the maximum height shall be one inch.

(C) Bottom pouring.

A pig or holding ladle shall be so positioned as to receive hot metal should the stopper malfunction or fail to fully shut off the metal flow.

(D) Ladle additions.

- (1) Moist metal shall not be added to molten metal.
- (2) Iron in a ladle shall not be treated with magnesium or its alloys while the ladle is suspended from a hoist or crane unless the cables are shielded.

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4123:1-7-06

Trunnions.

- (A) Trunnions and the devices used to attach them to flasks, buckets, ladles, and other equipment shall be constructed with a factor of safety of no less than ten.
- (B) The diameter of the head on the outside end of the trunnion shaft shall be no less than one and one-half times the diameter of the shaft.
- (C) When trunnions are used with wire rope slings or chain, the diameter of the head shall be no less than the diameter of the shaft plus one and one-half times the diameter of the sling or chain size used.
- (D) The inside corners where the trunnion shaft joins the base and the head shall be filleted.
- (E) The radius of the corner between the groove and the head shall be approximately equal to the radius of the sling used, the remainder of the inside edge of the head being straight.

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4123:1-7-07

Scrap breakers.

- (A) The breaking of scrap or castings by the use of a demolition weight inside the foundry building during regular operating periods is prohibited.
- (B) Where a demolition weight is used to break skulls and scrap outside the foundry building, the operation shall be performed in a restricted or guarded area identified by appropriate signs and away from employees not involved in demolition work.

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4123:1-7-08

Cupolas.

(A) Charging.

- (1) A substantial cover constructed to allow for ventilation shall be provided at the charging floor level and between the cupola shell and charging floor when employees are working inside the cupola and below the charging floor level.
- (2) The area underneath cupola charging equipment shall be guarded to prevent material from dropping onto employees during charging operations.

(B) Dropping cupola bottom.

- (1) The area underneath the cupola shall be free from liquid before the bottom is dropped.
- (2) A whistle or other warning signal shall alert employees before the bottom is dropped.
- (3) A block and tackle, wire rope, chain, or other mechanical means shall be used to drop the bottom.
- (4) The area surrounding the operation shall be cleared of all employees at the time the bottom is dropped, except for the employee(s) pulling the pin or posts who shall be protected by shielding, protective clothing or protective equipment.

(C) Cupola bottom support.

- (1) When the cupola is in operation, its bottom doors shall be supported by a drop leg and two adjustable screw props on a metal prop base set on a concrete or other fabricated footing of equivalent strength, provided that, where the bottom doors are supported by hydraulic door closers or equivalent, a drop leg or a door locking mechanism is required.
- (2) Temporary supports, such as timbers, blocking, or shoring, shall be placed under the cupola bottom doors to prevent a premature bottom drop.
- (3) Mechanical means shall be provided for raising the bottom doors of the cupola.

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4123:1-7-09

Crucibles.

(A) Crucibles shall be maintained in good condition, free from cracks and other flaws.

(B) Crucibles shall be stored in a warm, dry place immediately prior to being used.

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4123:1-7-10

Sand mullers and mixers.

- (A) Sand mullers and mixers shall be locked out to prevent operation while employees are inside the chamber.

- (B) Openings used for the sampling of sand shall be guarded and all other mixer openings shall be provided with a screen or equivalent protection.

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4123:1-7-11 Molds and cores.

(A) Molds.

- (1) No employee shall be required to work under molds suspended from cranes.
- (2) All molding machines shall be equipped with two-hand controls or equivalent protective devices for each employee assigned to the machine.
- (3) Automatic molding machines which go through a complete cycle without an operator shall be guarded.
- (4) Where the clearance between the mold conveyor and any fixed or portable object is less than eighteen inches, the space or clearance shall be blocked to prevent passage.
- (5) When a molding machine is to be repaired, all energy sources shall be shut off, locked out, and any pressure bled from the machine.

(B) Cores.

- (1) The surfaces of all core boxes used in bench work shall be smooth and free from splinters or sharp edges.
- (2) Automatic or semi-automatic core blowing machines shall be guarded.
- (3) When a core machine is to be repaired, all energy sources shall be shut off, locked out, and any pressure bled from the machine.
- (4) Walk-in ovens shall be provided with a means of escape from the inside, such as emergency exit doors, kickout panel or plate, duplicate opening mechanism, etc.
- (5) In batch ovens, sufficient space shall be provided to allow unobstructed access for employees or machine loading.
- (6) Batch ovens having vertically sliding doors shall be provided with devices which keep the door in the raised position.

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4123:1-7-12

Sandblasting.

Where sandblasting occurs, employees shall be protected by personal protective equipment, dust-tight enclosures, or equivalent means of protection to prevent injurious exposures.

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Tumbling mills.

- (A) All tumbling mills shall be provided with a suitable guard to protect employees from the exposed parts of the mill during operation.

- (B) Manually loaded tumbling mills shall be equipped with a locking device to prevent the mill from turning when the doors are opened.

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4123:1-7-14

Chipping and grinding.

Where castings are cleaned by chipping or grinding, employees shall be protected from flying chips or particles by personal protective equipment, screens, partitions, or equivalent protection.

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