



**DEPARTMENT OF LABOR & ECONOMIC GROWTH  
DIRECTOR'S OFFICE  
GENERAL INDUSTRY SAFETY STANDARDS**

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(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 408.17610, R 408.17612, and R 408.17615 of the Michigan Administrative Code, appearing on pages 747 to 750 of the 1989 Annual Supplement to the 1979 Michigan Administrative Code, are amended to read as follows:

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**PART 76. SPRAY FINISHING AND DIP TANKS**

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**GENERAL PROVISIONS**

**R 408.17601. Scope.**

**Rule 7601.** This part sets forth rules and specifications for spray finishing and dip tank operations in, around or about places of employment. This part also covers the application of combustible powders by powder spray guns, electrostatic powder spray guns, fluidized beds, or electrostatic fluidized beds. This part does not apply to outdoor spray application of buildings, tanks, or other similar structures or to small portable spraying apparatus which is not used repeatedly in the same location.

**R 408.17602. Definitions; A to L.**

**Rule 7602.** (1) "Aerated solid powders" means any powdered material used as a coating material which shall be fluidized within a container by passing air uniformly through the material.

(2) "Approved" means, unless otherwise indicated, approval or listing by underwriters laboratories, inc. or factory mutual engineering corporation, or both.

(3) "Combustible liquid" means any liquid having a flash point at or above 100 degrees Fahrenheit (37.8 degrees Celsius) closed cup.

(4) "Dip tank" means a tank, vat, or container of flammable or combustible liquid in which articles or materials are

immersed for the purpose of coating, finishing, treating, or similar processes.

(5) "Electrostatic fluidized bed" means a container holding powder coating material which is aerated so as to form an air-supported expanded cloud of such material which is electrically charged with a charge opposite to the charge of the object to be coated; such object is transported through the container immediately above the charged and aerated materials in order to be coated.

(6) "Flammable liquid" means any liquid having a flash point below 100 degrees Fahrenheit (37.8 degrees Celsius) closed cup and have a vapor pressure not exceeding 40 psi absolute (2068.6 mm) at 100 degrees Fahrenheit (37.8 degrees Celsius).

(7) "Fluidized bed" means a container holding powder coating material which is aerated so as to form an air-supported expanded cloud of such material and through which the preheated object to be coated is immersed and transported.

(8) "Liquids" within the scope of this standard, means combustible liquid or flammable liquid.

(9) "Listed" means "approved" as defined in subrule (2) of this rule.

(10) "Lower explosive limit (LEL)" means the lowest value expressed in percent by volume, of fuel vapor in air which will burn when ignited.

#### **R 408.17603. Definitions; S, V.**

**Rule 7603.** (1) "Spray area" means any area in which dangerous quantities of flammable or combustible vapors, mists, residues, dusts, or deposits are present due to the operation of spray processes. A spray area includes all of the following areas:

(a) The interior of spray booths and rooms, except as specifically provided for in R 408.17613(4).

(b) The interior of ducts exhausting from spraying processes.

(c) Any area in the direct path of spraying operations.

(2) "Spray booth" means a power-ventilated structure provided to enclose or accommodate a spraying operation to confine and limit the escape of spray, vapor, and residue, and to safely conduct or direct them to an exhaust system.

(3) "Spray finishing operations" means the employment of methods wherein organic or inorganic materials are utilized in dispersed form for deposit on surfaces to be coated, treated, or cleaned. Such methods of deposit may involve either automatic, manual, or electrostatic deposition, but do not include metal spraying or metallizing, dipping, flow coating, roller coating, tumbling, centrifuging, or spray washing and degreasing as conducted in self-contained washing and degreasing machines or systems.

(4) "Spray room" means a room in which spray finishing operations which are not conducted in a spray booth are performed separately from other areas.

(5) "Vapor area" means any area containing flammable vapor concentrations exceeding 25% of the lower explosive limit (LEL) in the vicinity of dipping and coating processes, drainboards or associated drying, conveying, or other equipment, during operation or shutdown periods.

#### **R 408.17605. Employer responsibilities.**

**Rule 7605.** (1) An employer shall provide training to each assigned employee regarding the operation, maintenance, hazards, and safeguards of the job covered by this part.

(2) An employer shall not knowingly authorize a process, machine, or equipment to be used which does not meet applicable state safety standards.

(3) An employer shall provide, to each employee, the personal protective equipment required by the job as prescribed in Part 33. Personal Protective Equipment, being R 408.13301 et seq. of the Michigan Administrative Code.

#### **R 408.17607. Employee responsibilities.**

**Rule 7607.** (1) An employee shall not operate a machine or equipment until trained in the operating procedures, hazards, and safeguards. The employee shall not operate a machine or equipment until assigned to do so by the employer.

(2) An employee shall report to his or her supervisor any recognized hazards.

(3) An employee shall use required personal protective equipment or devices as prescribed in this part or a specific standard.

(4) An employee shall not remove a guard or other safety device, except for authorized servicing purposes. If a guard or other safety device is removed, it shall be replaced or equivalent guarding shall be provided before the machine or equipment is returned to normal operation.

#### **R 408.17609. "No smoking" signs; posting, smoking restriction area.**

**Rule 7609.** Smoking shall be prohibited and "No smoking" signs in large letters on contrasting color backgrounds shall be conspicuously posted in the vicinity of all of the following areas:

(a) Dip tanks and spraying areas.

(b) Flammable and combustible liquid storage and mix rooms.

(c) Powder coating areas.

(d) Powder storage rooms.

(e) Any area where organic peroxides are stored, mixed, or applied.

The no smoking restriction shall extend 20 feet (6 m) from the area unless separated by a noncombustible, vapor-tight partition.

#### **R 408.17610. Spraying areas; maintenance; use of spray booths; spray rooms used for production spray finishing operations.**

**Rule 7610.** Spraying shall not be conducted outside of designated spraying areas.

(2) All spraying areas shall be maintained so that the accumulation of deposits of combustible residues does not create a hazard. Scrapers, spuds, or other tools that are used for cleaning purposes shall be made of nonsparking material.

(3) After cleaning, residue scrapings and debris contaminated with residue shall be immediately removed from the premises and properly disposed of. Approved metal waste cans shall be provided when rags or waste is impregnated with finishing material and all such rags or waste shall be deposited in the waste cans immediately after use. The contents of waste cans shall be properly disposed of at least once daily or at the end of each shift.

(4) The clothing of spray finishing employees shall not be left on the premises more than 24 hours, unless the clothing is kept in metal lockers.

(5) The use of solvents for cleaning operations shall be restricted to solvents that have flash points of not less than 100 degrees Fahrenheit; however, for cleaning spray nozzles and auxiliary equipment, solvents that have flash points which are not less than the flash points of solvents that are normally used in spray operations may be used. Such cleaning shall be conducted inside spray booths and ventilating equipment that is operated during cleaning.

(6) Spray booths shall not be alternately used for different types of coating materials if the combination of the materials might be conducive to spontaneous ignition, unless all deposits of the first material that is used are removed from the booth and exhaust ducts before spraying with the second material that is used.

(7) Spray rooms that are used for production spray finishing operations shall conform to the requirements for spray booths.

#### **R 408.17612. Spray booths.**

**Rule 7612.** (1) The floor surface of a spray booth and operator's working area, if combustible, shall be covered with a noncombustible material that facilitates the safe cleaning and removal of residues.

(2) In conventional dry-type spray booths, overspray dry filters or filter rolls, if installed, shall conform to all of the following provisions:

(a) All discarded filter pads and filter rolls shall be immediately removed to a safe, well-detached location or placed in a water-filled metal container and disposed of at the close of the day's operation, unless such filter pads and rolls are maintained completely in water.

(b) Space within the spray booth on the downstream and upstream sides of filters shall be protected with approved automatic sprinklers.

(c) Filters or filter rolls shall not be used when applying a spray material that is known to be highly susceptible to spontaneous heating and ignition.

(d) Clean filters or filter rolls shall be noncombustible or of a type that has a combustibility factor that is not more than the combustibility factor of class 2 filters as listed by underwriters laboratories, inc. Filters and filter rolls shall not be alternately used for different types of coating materials if the combination of materials might be conducive to spontaneous ignition. See R 408.17610.

(3) Each spray booth shall be separated from other operations by not less than 3 feet or by partitions or walls so as to reduce the danger from the juxtaposition of hazardous operations. See R 408.17650(1).

(4) Spray booths shall be installed so that all portions are readily accessible for cleaning. A clear space of not less than 3 feet on all sides shall be kept free from storage of combustible material.

(5) When spraying areas are illuminated through glass panels or other transparent materials, only fixed lighting units shall be used as a source of illumination. Panels shall effectively isolate the spraying area from the area in which the lighting unit is located. Panels shall be made of a noncombustible material which, because of the nature of the material or the manner in which the material is protected, makes breakage unlikely. Panels shall be arranged so that normal accumulations of residue on the exposed surface of the panel will not be raised to a dangerous temperature by radiation or conduction from the source of illumination.

(6) Ventilation systems to remove flammable vapors and confine overspray residue to the spray area shall be provided and used. The spraying operations shall be designed, installed, and maintained so that the average air velocity over the open face of the booth (or booth cross section during spraying operations) shall be not less than 100 linear feet (30.48 meters) per minute.

#### **R 408.17613. Drying, curing, or fusion apparatus.**

**Rule 7613.** (1) Drying, curing, or fusion apparatus in connection with spray application of flammable and combustible finishes shall conform to the applicable provisions of the publication entitled "Standard for Ovens

and Furnaces," NFPA 86-A-1977, as adopted by reference in R 408.17699(1), and shall also conform to all of the requirements of this rule.

(2) Spray booths, rooms, or other enclosures used for spraying operations shall not alternately be used for the purpose of drying by any arrangement which will cause a material increase in the surface temperature of the spray booth, room, or enclosure.

(3) Except as specifically provided in subrule (4) of this rule, drying, curing, or fusion units utilizing a heating system having open flames or which might produce sparks shall not be installed in a spraying area, but may be installed adjacent thereto when equipped with an interlocked ventilating system arranged to do all of the following:

(a) Provide a minimum of 4 complete air changes to thoroughly purge the drying space before the heating system can be started.

(b) Maintain a safe atmosphere at any source of ignition.

(c) Automatically shut down the heating system if the ventilating system fails.

(4) Automobile refinishing spray booths or enclosures, otherwise installed and maintained in full conformity with this rule, may alternately be used for drying when all of the following provisions are complied with:

(a) Interior, especially floors, of spray enclosures shall be kept free of overspray deposits, in accordance with R 408.17610(2).

(b) During spray operations, the drying apparatus and electrical connections and wiring thereto shall not be located within the spray enclosure or in any other location where spray residues might be deposited thereon.

(c) The spraying apparatus, the drying apparatus, and the ventilating system of the spray enclosure shall be equipped with suitable interlocks arranged so that all of the following provisions are complied with:

(i) The spraying apparatus cannot be operated while the drying apparatus is inside the spray enclosure.

(ii) The spray enclosure shall be purged of spray vapors for a period of not less than 4 complete air changes before the drying apparatus can be energized.

(iii) The ventilating system will maintain a safe atmosphere within the enclosure during the drying process and the drying apparatus will automatically shut off if the ventilating system fails.

(d) All electrical wiring and equipment of the drying apparatus shall conform to the applicable sections of the general industry standards 1910.308, Application, and 1910.309, Electrical. See R 408.17699(2). Only equipment of a type approved for class I, division 2 hazardous locations shall be located within 18 inches of the floor level. All metallic parts of the drying apparatus shall be properly electrically bonded and grounded.

(e) The drying apparatus shall contain a prominently located, permanently attached warning sign indicating that ventilation shall be maintained during the drying period and that spraying shall not be conducted in the vicinity that spray will deposit on said apparatus.

#### **R 408.17614. Automobile undercoating.**

**Rule 7614.** Automobile undercoating spray operations conducted in areas having natural or mechanical ventilation adequate to comply with the division of occupational health requirements are exempt from the requirements pertaining to spray finishing operations when using undercoating materials which are not more hazardous than kerosene, as listed by underwriters laboratories inc. with respect to fire hazard rating 30- 40, or undercoating materials using only solvents listed as having a flash point in excess of 100 degrees Fahrenheit. Undercoating spray operations which do not conform to O.H. rule 3235(6)(p) of the division of occupational health

requirements are subject to all provisions of this rule pertaining to spray finishing operations.

**R 408.17615. Powder coating.**

**Rule 7615.** (1) Where powder coating is applied, electrical equipment and other sources of ignition shall conform to the requirements of R 408.17650(1), (8), and (9) of this part and general industry standards 1910.308, application, and 1910.309, electrical. See R 408.17699(2).

(2) The provisions of R 408.17630 and subrules (3) to (9) of this rule shall apply to fixed electrostatic equipment, except that electrical equipment that is not regulated in the provisions of R 408.17630 or subrules (3) to (9) of this rule shall conform to the provisions of subrule (1) of this rule.

(3) The provisions of R 408.17633 and this rule shall apply to electrostatic handguns when used in powder coating, except that electrical equipment that is not covered in the provisions of R 408.17633 or this rule shall conform to the provisions of subrule (1) of this rule.

(4) Electrostatic fluidized beds and associated equipment shall be approved types of beds and associated equipment. The maximum surface temperature of the beds and associated equipment in the coating area shall not be more than 150 degrees Fahrenheit. The high voltage circuits shall be designed so as to not produce a spark of sufficient intensity to ignite any powder-air mixtures or result in a shock hazard upon coming in contact with a grounded object under normal operating conditions.

(5) Transformers, high-voltage supplies, control apparatus, and all other electrical portions of the equipment, with the exception of the charging electrodes and their connections to the power supply, shall be located outside of the powder coating area or shall otherwise conform to the requirements of subrule (1) of this rule.

(6) All electrically conductive objects within the charging influence of the electrodes shall be adequately grounded. The power coating equipment shall carry a prominent, permanently installed warning regarding the necessity for grounding these objects.

(7) Objects that are being coated shall be maintained in contact with the conveyor or other support to insure proper grounding. Hangers shall be regularly cleaned to insure effective contact and areas of contact shall be sharp points of knife edges where possible.

(8) Conveyors, solenoids, powerpacks, and electrical equipment shall be interlocked with the exhaust or recirculating air ventilation system, or both, so that the equipment cannot be operated unless the ventilation fans are in operation.

(9) All of the following shall be designed to withstand an internal dust explosion or be provided with explosion relief that is vented to the outside atmosphere:

- (a) Powder coating operations.
- (b) Powder supply hoppers.
- (c) Recirculating systems.
- (d) Dust collectors.
- (e) Exhaust systems.
- (f) Related duct work.

(10) Electrostatic spraying operations shall be conducted with an air velocity over the open face of the booth of not less than 60 linear feet (18.2880 meters) per minute. More air velocity may be required depending upon the volume of the finishing material being applied and its flammability and explosion characteristics.

(11) Visible gauges or audible alarm or pressure activated gauges shall be installed to indicate or insure that the required air velocity is maintained.

(12) Filter rolls shall be inspected to insure the replacement of filter media.

**R 408.17616. Organic peroxides and dual component coatings.**

**Rule 7616.** All spraying operations involving the use of organic peroxides and other dual component coatings shall be conducted in approved sprinklered spray booths meeting the requirements of this part.

**R 408.17618. Maintenance of areas of operations using powder coating, organic peroxides, and dual component coatings; use of nonsparking tools.**

**Rule 7618.** (1) All areas of operation using powder coating shall be kept free of the accumulations of powder coating dusts, particularly such horizontal surfaces as ledges, beams, pipes, hoods, booths, and floors.

(2) Surfaces in areas of operations using powder coating, organic peroxides, and dual component coatings shall be cleaned in a manner which avoids scattering dust to other places or creating dust clouds.

(3) Only nonsparking tools shall be used in any area where organic peroxides, powder coating, or dual component materials are stored, mixed, or applied.

## DIP TANKS

**R 408.17620. Construction of dip tanks.**

**Rule 7620.** (1) Dip tanks, including drainboards if provided, shall be constructed of noncombustible material and their supports shall be made of heavy metal, reinforced concrete, or masonry. Where dip tanks extend through a floor to the story below or where the weakening of the tank supports by fire might result in the tank collapsing, supports shall be made of material having no less than 1-hour fire resistance rating.

(2) Dip tanks of over 150 gallons in capacity or 10 square feet in liquid surface area shall be equipped with trapped overflow pipes which prevent passage of vapors and which lead to a safe location outside buildings. Smaller dip tanks shall also be so equipped, where practical. The discharge of the overflow pipe shall be located and arranged so that if the entire combustible contents of the dip tank are overflowed through overflow pipe by the application of water during fire fighting, property will not be endangered. The size of the overflow pipe shall be sufficient to conduct the maximum rate of flow of water expected to be applied to the liquid surface of the dip tank from automatic sprinklers or from other sources in the event of fire.

(3) Overflow pipes shall be of sufficient capacity to overflow the maximum delivery of dip tank liquid fill pipes, but shall not be less than 3 inches in diameter and shall be increased in size depending upon the area of the liquid surface and the length and pitch of the pipe. Overflow connections may be omitted if the liquid has a flash point above 200 degrees Fahrenheit (93 degrees Celsius) or if the tanks are equipped with automatic closing covers or a fixed fire extinguishing system, other than water, as prescribed in Part 9. Fixed Fire Equipment, being R 408.10901 et seq. of the Michigan Administrative Code.

(4) Piping connections on drains and overflow lines shall be designed so as to permit ready access for inspection and cleaning of the interior.

(5) The bottom of the overflow connections shall be not less than 6 inches below the top of the tank. See subrule (11) of this rule and R 408.17637(4)(b).

(6) Dip tanks over 500 gallons in liquid capacity shall be equipped with combination automatic/manual bottom drains to

quickly drain the tank in the event of fire, unless the viscosity of the liquid at normal atmospheric temperature makes this impractical. Manual operation shall be from a safely accessible location. Where gravity flow is not practicable, automatic pumps shall be required.

(7) Such drain shall be trapped and discharged to a closed properly vented salvage tank or to a safe location outside which will not endanger property.

(8) According to tank capacity, the diameter of bottom drainpipe shall be not less than the following:

Gallons	Inches
500 to 750 .....	3
751 to 1,000 .....	4
1,001 to 2,500 .....	5
2,501 to 4,000 .....	6
Over 4,000 .....	8

(9) The capacity of the salvage tank shall be greater than the capacity of the dip tank or tanks to which they are connected.

(10) Except as noted in R 408.17622(5), all dip tanks exceeding 150 gallons of liquid capacity or having liquid surface area of more than 10 square feet shall be protected with at least 1 of the automatic extinguishing facilities conforming to R 408.17637(3), (4), (5), (6), or (7).

(11) Dip tanks utilizing a conveyor system shall be so arranged that in the event of fire, the conveyor system shall automatically cease motion and required bottom drains shall open. Conveyor systems shall automatically cease motion unless required ventilation is in full operation.

(12) Ventilation shall be provided to confine flammable vapor concentrations exceeding 25% of the lower explosive limit to within 5 feet (1.5m) of the dip tank, drainboard, and freshly coated work.

(13) When dip tank liquids are artificially heated, either by the dipping of heated articles, or by other application of heat to the liquid, provision shall be made to prevent a temperature rise of more than 50 degrees Fahrenheit below the flashpoint of the liquid. See R 408.17622(3) and (4).

#### **R 408.17621. Operations and maintenance.**

**Rule 7621.** (1) Areas in the vicinity of dip tanks shall be kept as clear of combustible stock as practical and shall be kept entirely free of combustible debris.

(2) When waste or rags are used in connection with dipping operations, approved metal waste cans shall be provided and all impregnated rags or waste shall be deposited therein immediately after use. The contents of waste cans shall be properly disposed of at least once daily at the end of each shift.

(3) A quarterly visual inspection or test of all dip tank facilities shall be made, including all of the following:

- Covers.
- Overflow pipe inlets and discharge.
- Bottom drains and valves.
- Electrical wiring and equipment and grounding connections.
- Ventilating facilities. Any defects found shall be promptly corrected.

(4) All fixed fire extinguishing systems shall be inspected and tested as prescribed in general industry safety standard, Part 9. Fixed Fire Equipment, being R 408.10901 et seq. of the Michigan Administrative Code.

(5) Floors and platforms around tanks shall be prevented from becoming slippery both by original type of

construction and by frequent flushing. The floors and platforms shall be firm, sound, and of a design and construction to minimize the possibility of tripping.

(6) When a required ventilating system serves associated drying operations utilizing a heating system which might be a source of ignition, means shall be provided for prevention of not less than 4 complete air changes before the heating system can be started, the failure of any ventilating fan shall automatically shut down the heating system, and the installation shall otherwise conform to the provisions of the publication entitled "Standard for Ovens and Furnaces," NFPA 86A-1977, as adopted by reference in R 408.17699(1).

#### **R 408.17622. Hardening and tempering tanks.**

**Rule 7622.** (1) Hardening and tempering tanks shall be located as far as practicable from furnaces and shall not be located on or near combustible floors.

(2) Tanks shall be provided with a noncombustible hood and vent or other equally effective means of venting to the outside of the building to serve as a vent in case of fire. All such vent ducts shall be treated as flues and be kept well away from combustible roofs or materials.

(3) Tanks shall be designed so that the maximum work load is incapable of raising the temperature of the cooling medium to within 50 degrees below its flash point, or such tanks shall be equipped with circulating cooling systems which will accomplish the same result.

(4) Tanks shall be equipped with a high temperature limit switch arranged to sound an alarm when the temperature of the quenching medium reaches within 50 degrees Fahrenheit below the flash point. Such limit switches shall also shut down conveying equipment supplying work to the tanks, unless a greater safety hazard is created.

(5) The provisions of R 408.17620(10) shall apply to tanks having a liquid surface area of 25 square feet or more or a capacity of 500 gallons or more.

(6) Air under pressure shall not be used to fill or agitate oil tanks; however, pneumatically operated impellers are permitted.

(7) Drain facilities from the bottom of the tank may be combined with the oil circulating system or arranged independently to drain the oil to a safe location. The drain valve shall be operated automatically with approved heat-actuated devices or manually and, if operated manually, the valve shall be operated from a safe distance. An automatic drain valve shall not be provided on a internal quench tank with a controlled atmosphere where the oil provides a seal to atmosphere.

#### **R 408.17623. Flow coat operations; general.**

**Rule 7623.** (1) Except as provided in this rule, all of the preceding rules for dip tanks apply to flow coat operations.

(2) All piping shall be strongly erected and rigidly supported.

(3) Paint shall be supplied by direct low-pressure pumping arranged to automatically shut down by means of approved heat-actuated devices in the case of fire or paint may be supplied by a gravity tank not exceeding 10 gallons in capacity.

(4) The area of the sump and any areas on which paint flows are considered the areas of dip tank.

#### **R 408.17624. Roll coating.**

**Rule 7624.** (1) The process of roll coating, spreading, and impregnating in which fabrics, paper, or other materials are passed directly through a tank or trough containing flammable or combustible liquids or over the surface of a roller that revolves partially submerged in a flammable or combustible liquid with a flash point below 140 degrees Fahrenheit (60

degrees Celsius) shall conform to the applicable requirements of R 408.17637, R 408.17641, and R 408.17651.

(2) Adequate arrangements shall be made to prevent sparks from static electricity by electrically bonding and grounding all metallic rotating and other parts of machinery and equipment and by installing static collectors where the material leaves a rotating part or maintaining a conductive atmosphere such as a high relative humidity.

## ELECTROSTATIC APPARATUS

### R 408.17630. Electrostatic apparatus; installation and use.

**Rule 7630.** (1) The installation and use of electrostatic spraying equipment and electrostatic detearing equipment shall conform to the requirements of these rules.

(2) Electrostatic apparatus and devices used in connection with coating operations or paint detearing operations shall be of the approved types.

(3) Electrostatic apparatus shall be equipped with automatic controls which will operate without time delay to disconnect the power supply to the high-voltage transformer and to signal the operator under any of the following conditions:

(a) Stoppage of the exhaust ventilating system from any cause.

(b) Stoppage of the conveyor carrying goods through the high voltage field, unless stoppage is required by the spray process.

(c) Occurrence of a ground or excessive current leakage at any point on the high-voltage system.

(d) Reduction of clearance below that specified in R 408.17631(4) and R 408.17632(4).

### R 408.17631. Fixed electrostatic apparatus used in spray finishing operations.

**Rule 7631.** (1) Transformers, high-voltage supply, control apparatus, and all other electrical portions of the equipment used in spray finishing operations, with the exception of high-voltage grids, electrodes, and electrostatic atomizing heads and their connections shall be located outside of the spraying area or shall otherwise conform to the requirements of R 408.17650(4), (5), and (6).

(2) Electrodes and electrostatic atomizing heads shall be adequately supported in permanent locations and shall be effectively insulated from the ground. Electrodes and electrostatic atomizing heads which are permanently attached to their bases, supports, or reciprocators shall be deemed to comply with this rule. Insulators shall be nonporous and noncombustible.

(3) High-voltage leads to electrodes shall be properly insulated and protected from mechanical injury or exposure to destructive chemicals. Electrostatic atomizing heads or any exposed element at high voltage shall be effectively guarded against accidental contact or grounding. An automatic means shall be provided for grounding the electrode system when it is electrically deenergized for any reason. All insulators shall be kept clean and dry.

(4) A safe distance of not less than twice the sparking distance shall be maintained between goods being painted and electrodes or electrostatic atomizing heads or conductors. A suitable sign indicating this safe distance shall be conspicuously posted near the assembly.

(5) Goods being painted using this process are to be automatically conveyed. The conveying devices shall be

arranged so as to maintain safe distance between the goods and the electrodes or electrostatic atomizing heads at all times. Any irregularly shaped or other goods subject to possible swinging or movement shall be supported to prevent swinging or movement which would reduce the clearance to less than that specified in subrule (4) of this rule.

(6) Booths, fencing, railings, or guards shall be placed about the equipment so that they, by their location or character or both, assure that a safe isolation of the process is maintained from plant storage or employees. Such railings, fencing, and guards shall be made of conducting material and shall be adequately grounded. Where automatic equipment is used, interlocked entry doors or gates shall be provided which shut down the operation. Where moving line arrangements would preclude this level of protection, such as at entrances and exits to the line access, warning signs shall be posted indicating the potential hazard of these areas.

(7) When finishing materials are applied by electrostatic hand spraying equipment which is manipulated by hand, R 408.17633 is applicable.

### R 408.17632. Electrostatic apparatus used in dip tank operations.

**Rule 7632.** (1) Transformers, high-voltage supplies, control apparatus, and all other electrical portions of the equipment used in dip tank operations, with the exception of high-voltage grids and their connections, shall be located outside the vapor area or shall conform to the requirements of R 408.17651.

(2) Electrodes shall be of substantial construction, shall be rigidly supported in permanent locations, and shall be effectively insulated from ground. Insulators shall be nonporous and noncombustible.

(3) High-voltage leads to electrodes shall be effectively and permanently supported on suitable insulators and shall be effectively guarded against accidental contact or grounding. An automatic means shall be provided for grounding and discharging any accumulated residual charge on the electrode assembly or the secondary circuit of the high-voltage transformer when the transformer primary is disconnected from the source of supply.

(4) A space of not less than twice the sparking distance shall be maintained between goods being deteared and electrodes or conductors. A sign stating the sparking distance shall be conspicuously posted near the assembly.

(5) Goods being deteared using this electrostatic process are to be automatically conveyed. The conveying devices shall be arranged so as to maintain a safe distance between the goods and the electrodes at all times. All goods shall be supported so as to prevent any swinging or movement which would reduce the clearance to less than specified in subrule (4) of this rule.

(6) This electrostatic process shall not be performed where goods being deteared are manipulated by hand.

(7) Adequate fencing, railings, or guards shall be placed about the equipment involving electrostatic apparatus so that they, by their location or character or both, assure that a safe isolation of the process is maintained from plant storage or employees. Such railings, fencing, and guards shall be made of conducting material, shall be adequately grounded, and shall be not less than 5 feet from the processing equipment.

(8) Electrode insulators shall be kept clean and dry.

(9) The detearing area shall be ventilated by exhausting adequate air from the area as specified in R 408.17621(6).

(10) All areas for detearing shall be protected by automatic sprinklers in accordance with the applicable provisions of Part 9. Fixed Fire Equipment, being R 408.10919 to R 408.10926, where this protection is available. Where this protection is not available, other approved automatic extinguishing equipment shall be provided.

(11) Drip plates and screens subject to paint deposits shall be removable and shall be taken to a safe place for cleaning.

**R 408.17633. Electrostatic hand spraying equipment and devices used in coating operations.**

**Rule 7633.** (1) Electrostatic hand spraying apparatus and devices used in connection with coating operations in which the atomizing device is hand-held and manipulated during the spraying operation shall be of approved types.

(2) The equipment shall be designed so that the maximum surface temperature of the equipment in the spraying area shall not exceed 150 degrees Fahrenheit under any condition.

(3) The high-voltage circuits shall be designed so as to not produce a spark of sufficient intensity to ignite any vapor-air mixtures or powder-air mixtures or result in a shock hazard upon coming in contact with a grounded object under all normal operating conditions.

(4) The electrostatically charged exposed elements of the handgun shall be capable of being energized only with a switch or an actuator, or both, which also controls the coating material supply.

(5) Transformers, high-voltage supplies, control apparatus, and all other electrical portions of the equipment, with the exceptions of the handgun itself and its connections to the power supply, shall be located outside of the spraying area or shall otherwise conform to the requirements of R 408.17650(4), (5), and (6).

(6) The handle of the spraying gun shall be electrically connected to ground by metallic connection and be constructed so that the operator in the normal operating position is in intimate electrical contact with the ground handle.

(7) All electrically conductive objects in the spraying area shall be properly grounded. This requirement shall apply to paint containers, wash cans, and any other electrically conductive objects or devices in the area. The equipment shall carry a prominent, permanently installed warning regarding the necessity for this grounding feature.

(8) Objects being painted or coated shall be maintained in metallic contact with the conveyor or other grounded support. Hooks shall be regularly cleaned to insure this contact and areas of contact shall be sharp points or knife edges where possible. Points of support of the object shall be concealed from random spray where feasible. If the objects being sprayed are supported from a conveyor, the point of attachment to the conveyor shall be located so as to not collect spray material during normal operation.

(9) The electrical equipment shall be so interlocked with the ventilation of the spraying area that the equipment cannot be operated unless the ventilation fans are in operation.

## FIRE PROTECTION

**R 408.17636. Spray finishing.**

**Rule 7636.** (1) All areas used for spraying, including the interior of the booth, shall be protected by automatic sprinklers where this protection is available. Where this protection is not available, other approved automatic extinguishing equipment shall be provided as prescribed in Part 9. Fixed Fire Equipment, being R 408.10901 et seq. of the Michigan Administrative Code.

(2) In sprinklered buildings, the automatic sprinkler system in rooms containing spray finishing operations shall conform to the provisions for high hazard occupancy of Part 9. Fixed Fire Equipment, being R 408.10901 et

seq., and in unsprinklered buildings where sprinklers are installed only to protect spraying areas, the sprinkler installation shall conform to the provisions of this rule.

(3) Sprinkler heads shall be located to effect water distribution throughout the entire booth.

(4) Automatic sprinklers protecting each spray booth, together with its connecting exhaust, shall be under an outside stem and yoke (OS&Y) subcontrol valve located outside of the spray booth.

(5) Sprinklers protecting spraying areas shall be kept free from coating material deposits. The use of polyethylene or cellophane bags having a thickness of .003 inches or less or thin paper bags is acceptable. Coverings shall be replaced or the heads cleaned frequently.

(6) Portable fire extinguishers shall be installed near all spraying areas.

**R 408.17637. Dip tanks.**

**Rule 7637.** (1) Except as noted in R 408.17622(5), all dip tanks exceeding 150 gallons liquid capacity or having a liquid surface area exceeding 10 square feet shall be protected with at least 1 of the automatic extinguishing facilities conforming to subrules (3), (4), (5), (6), and (7) of this rule.

(2) Areas in the vicinity of dip tanks shall be provided with fire extinguishers which are suitable for flammable and combustible liquid fires and which conform to general industry safety standard Part 8. Portable Fire Extinguishers, being R 408.10801 et seq. See R 408.17699(5).

(3) An automatic water spray extinguishing system shall conform to general industry safety standard Part 9. Fixed Fire Equipment, being R 408.10901 et seq., and shall be arranged to protect tanks, drainboards, and stock over drainboards. See R 408.17699(4).

(4) An automatic foam extinguishing system shall conform to general industry safety standard Part 9. Fixed Fire Equipment, being R 408.10901 et seq., and shall have the foam-producing material selected to be suitable for intended use, taking into account characteristics of the dip tank liquid; and shall have the overflow pipe arranged to prevent the floating away of foam and clogging the overflow pipe, which may be accomplished by either of the following:

(a) Overflow pipe may be extended through the tank wall and terminated in an ell pointing downward. The bottom of the overflow pipe at the point it pierces the tank wall shall not be more than 2 inches above the opening or face of the ell.

(b) Overflow pipe inlet may be provided with a removable screen of 1/4 inch mesh having an area which is not less than twice the crosssectional area of overflow pipe. Screens which might be clogged by dip tank ingredients shall be inspected and cleaned periodically.

(5) Automatic carbon dioxide systems shall conform to general industry safety standard Part 9. Fixed Fire Equipment, being R 408.10901 et seq., and shall be arranged to protect both dip tanks and drainboards, and, unless stock over drainboards is otherwise protected with automatic extinguishing facilities, shall also be arranged to protect such stock. See R 408.17699(4).

(6) Dry chemical extinguishing system shall conform to general industry safety standard Part 9. Fixed Fire Equipment, being R 408.10901 et seq., and shall be arranged to protect both dip tanks and drainboards, and, unless stock over drainboards is otherwise protected with automatic extinguishing facilities, shall also be arranged to protect such stock. See R 408.17699(4).

(7) A dip tank cover provided for fire protection shall comply with all of the following provisions:

(a) Be arranged to close automatically in the event of fire, be actuated by approved automatic devices, and be arranged for manual operations.

(b) Be of substantial noncombustible material or of tin-clad type material with enclosing metal applied with locked joints.

(c) Be kept closed when tanks are not in use.

(8) Chains or wire rope shall be used for the cover support or the operating mechanism where the burning of a cord would interfere with the action of a device.

(9) For areas of detearing, the requirements of R 408.17632(10) shall also apply.

## FLAMMABLE AND COMBUSTIBLE LIQUIDS

### R 408.17640. Flammable and combustible liquids.

**Rule 7640.** (1) The storage of flammable or combustible liquids shall conform to the requirements of 1910.106, Flammable and Combustible Liquids, where applicable. See R 408.17699(3).

(2) A closed container, an approved portable tank, an approved safety can, or properly arranged system of piping shall be used for bringing flammable or combustible liquids into a spray finishing room. Open or glass containers shall not be used.

(3) Except as provided in subrule (6) of this rule, the withdrawal of flammable and combustible liquids from containers having a capacity of more than 60 gallons shall be by approved pumps. The withdrawal of flammable or combustible liquids from containers and the filling of containers, including portable mixing tanks, shall be done only in a designated mixing room or in a spraying area when the ventilating system is in operation. Adequate precautions shall be taken to protect against liquid spillage and sources of ignition.

(4) When flammable or combustible liquids are transferred from one container to another, both containers shall be effectively bonded and grounded to prevent discharge sparks of static electricity.

(5) Containers supplying spray nozzles shall be of a closed type or provided with metal covers kept closed. Containers not resting on floors shall be on metal supports or suspended by wire cables. Containers supplying spray nozzles by gravity flow shall not exceed 10 gallons capacity. Original shipping containers shall not be subject to air pressure for supplying spray nozzles. Containers under air pressure supplying spray nozzles shall be of limited capacity, not exceeding that necessary for 1 day's operations; shall be designed and approved for such use; shall be provided with a visible pressure gauge; and shall be provided with a relief valve set to operate in conformance with the requirements of section VIII, entitled "Code for Unfired Pressure Vessels," of the publication entitled "ASME Boiler and Pressure Vessel Code — 1983," as adopted by reference in R 408.17699(6). Containers under air pressure supplying spray nozzles, or stoppage tanks, and coolers shall conform to the standards of such code for construction, tests, and maintenance.

(6) If flammable or combustible liquids are supplied to spray nozzles by positive displacement pumps, the pump discharge line shall be provided with an approved relief valve discharging to a pump section or a safe location or provided with a device to stop the prime mover if the discharge pressure exceeds the safe operating pressure of the system.

(7) All containers or piping to which a hose or flexible connection is attached shall be provided with a shutoff valve at the connection. Such valves shall be kept shut when spraying operations are not being conducted, except where recirculated systems are employed and monitored.

(8) When a pump is used to deliver products, automatic means shall be provided to prevent pressure in excess of the design working pressure of accessories, piping, and hose.

(9) All pressure hose and couplings shall be inspected at regular intervals. The hose and couplings shall be tested with the hose extended and using the inservice maximum operating pressures. Any hose showing material deterioration, signs of leakage, or weakness in its carcass or at the couplings shall be withdrawn from service and repaired or discarded.

(10) Piping systems conveying flammable or combustible liquids shall be made of steel or other material having comparable properties of resistance to heat and physical damage. Piping systems shall be properly bonded and grounded.

(11) An emergency shutdown provision, to cut off the supply of liquid to an area involved in a fire shall be a part of all fixed pipe systems delivering flammable or combustible liquids to spray operations.

### R 408.17641. Dipping operations; storage of flammable and combustible liquids; grounding and bonding of portable containers.

**Rule 7641.** (1) The storage of flammable and combustible liquids in connection with dipping operations shall conform to the requirements of section 1910.106, Flammable and Combustible Liquids, where applicable. See R 408.17699(3).

(2) Where portable containers are used for the replenishment of flammable and combustible liquids, provision shall be made so that both the container and tank shall be positively grounded and electrically bonded to prevent static electric sparks.

## ELECTRICAL AND OTHER SOURCES OF IGNITION

### R 408.17650. Electrical and other sources of ignition in spray finishing operations.

**Rule 7650.** (1) All electrical equipment, open flames, and other sources of ignition in spray finishing operations shall conform to the requirements of this rule, except as follows:

(a) Electrostatic apparatus shall conform to the requirements of R 408.17614, R 408.17618, R 408.17630, R 408.17631, and R 408.17633.

(b) Drying, curing, and fusion apparatus shall conform to the requirements of R 408.17613.

(c) Automobile undercoating spray operations shall conform to the requirements of R 408.17614.

(d) Powder coating equipment shall conform to the requirements of R 408.17615.

(2) There shall be no open flame, spark-producing equipment, or exposed surfaces in any spraying area or within 20 feet (6m) horizontally and 10 feet (3m) vertically thereof, unless separated by a noncombustible vapor-tight partition.

(3) Space-heating appliances, steam pipes, or hot surfaces shall not be located in a spray area where deposits of combustible residues might readily accumulate.

(4) Electrical wiring and equipment shall conform to the provisions of this rule and shall otherwise be in accordance with general industry standards 1910.308, Application, and 1910.309, Electrical. See R 408.17699(2).

(5) Unless specifically approved for locations containing both deposits of readily ignitable residue and explosive vapors, there shall be no electrical equipment, in any spraying area, on which deposits of combustible residues might readily accumulate, except for wiring in rigid conduit or in boxes of fittings containing no taps, splices, or terminal connections.

(6) Classification of hazardous areas shall be in accordance with NFPA standard 33-1982, entitled "Spray



Application Using Flammable and Combustible Materials.” See R 408.17699(7).

(7) Portable electric lamps shall not be used in any spraying area during spraying operations. Portable electric lamps, if used during cleaning or repairing operations, shall be of the type approved for hazardous class I locations.

(8) All metal parts of spray booths, exhaust ducts, and piping systems conveying flammable or combustible liquids or aerated solids shall be properly electrically grounded in an effective and permanent manner.

(9) Airless, high-fluid-pressure spray guns and any conductive object being sprayed shall be properly electrically grounded.

**R 408.17651. Electrical and other sources of ignition in dip tank operations.**

**Rule 7651.** (1) In dip tank operations, there shall be no open flames, spark-producing devices, or heated surfaces having a temperature sufficient to ignite vapors in any vapor area.

(2) Except as specifically permitted in R 408.17630 and R 408.17632, related to electrostatic apparatus, electrical wiring and equipment in any vapor area shall be of an explosion-proof type according to the requirements of general industry standards 1910.308, Application, and general industry standards 1910.309, Electrical, for class I, group D locations, and shall otherwise conform to general industry standards 1910.308 and 1910.309. See R 408.17699(2).

(3) Classification of hazardous areas shall be in accordance with NFPA standard 34-1982, entitled “Dipping and Coating Processes Using Flammable or Combustible Liquids.” See R 408.17699(8).

(4) In any floor space outside a vapor area, but within 20 feet there from, and not separated by noncombustible, vapor-tight partitions, there shall be no open flames or spark-producing devices, except as specifically permitted in NFPA standard 86A-1977, entitled, “Ovens and Furnaces,” paragraph 200-7, as adopted by reference in R 408.17699(1), and electrical wiring and equipment shall conform to the provisions of general industry standards 1910.308, Application, and 1910.309, Electrical. See R 408.17699(2).

**R 408.17696. Rescission of federal standards.**

**Rule 7696.** On the effective date of these rules, general industry standards 1910.107 entitled “Spray Finishing Using Flammable and Combustible Materials,” and 1910.108 entitled “Dip Tanks Containing Flammable or Combustible Liquids,” which were incorporated by reference by section 14(1) of Act No. 154 of the Public Acts of 1974, as amended, being §408.1014(1) of the Michigan compiled Laws, are rescinded.

**R 408.17699. Referenced standards; adopted standards.**

**Rule 7699.** (1) The standard entitled “Ovens and Furnaces,” NFPA 86A-1977, is adopted herein by reference. Copies of NFPA 86A-1977 may be purchased at a cost of \$7.00 from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

(2) General industry standards 1910.308, Application and 1910.309, Electrical, are federal standards which were incorporated by reference by section 14(1) of Act No. 154 of the Public Acts of 1974, as amended, being 408.1014(1) of the Michigan Compiled Laws.

(3) General industry standard 1910.106 Flammable and Combustible Liquids is a federal standard which was incorporated by reference by section 14(1) of Act No. 154 of the Public Acts of 1974, as amended.

(4) General industry safety standard Part 9. Fixed Fire Equipment, being R 408.10901 et seq. of the Michigan Administrative Code, was promulgated by the general industry safety standards commission in accordance with sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended, being 408.1016 and 408.1021 of the Michigan Compiled Laws.

(5) General industry safety standard Part 8. Portable Fire Extinguishers, being R 408.10801 et seq. of the Michigan Administrative Code, was promulgated by the general industry safety standards commission in accordance with sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended.

(6) Section VIII, entitled “Code for Unfired Pressure Vessels,” of the publication entitled “ASME Boiler and Pressure Vessel Code — 1983,” is adopted herein by reference. Copies of section VIII of the ASME Boiler and Pressure Vessel Code, 1983, may be purchased at a cost of \$110.00 from the American Society of Mechanical Engineers, Standards Department, United Engineering Center, 345 East 47th Street, New York, New York 19917.

(7) The standard entitled “ Spray Application Using Flammable and Combustible Materials,” NFPA 33-1982, is adopted herein by reference. Copies of NFPA 33- 1982 may be purchased at a cost of \$7.20 from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

(8) The standard entitled “Dipping and Coating Processes Using Flammable or Combustible Liquids,” NFPA 34-1982, is adopted herein by reference. Copies of NFPA 34-1982 may be purchased at a cost of \$8.55 from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

(9) The publications and general industry safety standards listed in subrules (1) to (8) of this rule may be inspected at, or purchased at the appropriate cost from, the Safety Standards Division, Bureau of Safety and Regulation, Michigan Department of Consumer and Industry Services, 7150 Harris Drive, Box 30643, Lansing, Michigan 48909.