



DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS

DIRECTOR'S OFFICE

CONSTRUCTION SAFETY STANDARDS

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

R 408.41802, R 408.41836, R 408.41837, R 408.41838, R 408.41841, R 408.41851, R 408.41852, R 408.41853,
R 408.41854, R 408.41855, R 408.41861, R 408.41862, R 408.41863, R 408.41864, R 408.41865, R 408.41866,
R 408.41867, R 408.41868, R 408.41869, R 408.41874, R 408.41875, R 408.41877, and R 408.41884,
of the Michigan Administrative Code are amended,
R 408.41861a, R 408.41861b, R 408.41861c, R 408.41861d, and R 408.41877a, are added,
and R 408.41871, R 408.41872, R 408.41876, R 408.41878, R 408.41879, R 408.41881, R 408.41882,
and R 408.41883, are rescinded, as follows:

PART 18. FIRE PROTECTION AND PREVENTION

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R 408.41801 Scope.

Rule 1801. This part pertains to all of the following:

- (a) Fire prevention plans.
- (b) Employee emergency plans.
- (c) Fire fighting equipment.
- (d) The storing and dispensing of flammable and combustible materials.
- (e) Heating devices for construction operations.

R 408.41802 Adopted and referenced standards.

Rule 1802. (1) The following standards are adopted by reference in these rules and are available from The National Fire Protection Association, (NFPA) 1 Batterymarch Park, Quincy, Massachusetts, 02169-7471, USA; telephone number: 617-770-3000; or via the internet at web-site: www.nfpa.org, at a cost as of the time of adoption of these rules as stated in this subrule.

(a) NFPA 13 "Installation Of Sprinkler System" 1991 edition. Cost \$27.00.

(b) NFPA 14 "Standard For The Installation Of Standpipe, Private Hydrants And Hose Systems", 2000 edition. Cost \$39.00.

(c) NFPA 25 "Inspection, Testing, And Maintenance Of Water-Based Fire Protection Systems", 1998 edition. Cost \$50.50.

(d) NFPA 251 "Standard Methods Of Fire Testing Of Building Construction And Materials," 1990 edition. Cost \$27.00.

(e) NFPA 30 "Flammable And Combustible Liquids Code," 1996 edition. Cost \$27.00.

(f) NFPA 385 "Standard For Tank Vehicles For Flammable And Combustible Liquids," 1990 edition. Cost \$27.00.

(g) NFPA 10A "Maintenance and Use of Portable Fire Extinguishers," 1970 edition. Cost \$29.00.

(h) NFPA 80 "Standard for Fire Doors and Windows," 1970 edition. Cost \$29.00.

(2) The following standards are adopted by reference in these rules and are available from IHS Global, 15 Inverness Way East, Englewood, Colorado, 80112, USA, telephone number: 1-800-854-7179 or via the internet at web-site: <http://global.ihs.com>; at a cost as of the time of adoption of these rules, as stated in this subrule.

(a) Compressed Gas Association (CGA) Standard CGA C7 "Guide To The Preparation Of Precautionary Labeling And Marking Of Compressed Gas Containers," 2000 edition. Cost \$892.00.

(b) American Society for Testing and Materials (ASTM) Standard ASTM D56 "Standard Test Method for Flash Point by Tag Closed Cup Tester," 1969 edition. Cost: \$58.00.

(c) ASTM D93 "Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester," 1969 edition. Cost \$67.00.

(3) The provisions of the Department of Transportation Title 49 C.F.R. Part 178, "Shipping Container Specifications," is adopted by reference in these rules and is available via the internet at web-site: www.ecfr.gov; which is free, as of the time of adoption of these rules.

(4) The standards adopted in these rules are available for inspection at the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 7150 Harris Drive, Lansing, Michigan, 48909-8143.

(5) Copies of the standards adopted in these rules may be obtained from the publisher or may be obtained from the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 7150 Harris Drive, Lansing, Michigan, 48909-8143, at the cost charged in this rule, plus \$20.00 for shipping and handling.

(6) The following Michigan occupational safety and health standards (MIOSHA) are referenced in these rules. Up to 5 copies of this standard may be obtained at no charge from the Michigan Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan, 48908-8143, or via the internet at 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) Construction Safety Standard Part 22 "Signals, Signs, Tags and Barricades," R 480.42201 to R 408.42242.

(b) Construction Safety Standard Part 42 "Hazard Communication," R 408.44201 to R 408.44203.

R 408.41836 Definitions; A to C.

Rule 1836. (1) "Approved" means equipment that has been listed or approved by a nationally recognized testing laboratory, such as Factory Mutual Engineering Corporation, or Underwriters' Laboratories, Inc., or federal agencies such as Bureau of Mines, or U.S. Coast Guard, which issue approvals for the equipment.

(2) "Closed container" means a container that is sealed by means of a lid or other device so that neither liquid nor vapor will escape from it at ordinary temperatures.

(3) "Combustion" means any chemical process that involves oxidation sufficient to produce light or heat.

(4) "Container" means all vessels, such as tanks, cylinders, or drums, used for transportation or storing liquefied petroleum gases.

(5) "Container in use" means a container connected for use.

R 408.41837 Definitions; F.

Rule 1837. (1) "Fire alarm signaling system" means an alerting signal that is clearly audible throughout all areas and which would immediately alert employees in case of an emergency.

(2) "Fire brigade" means an organized group of employees that are knowledgeable, trained, and skilled in the safe evacuation of employees during emergency situations and in assisting in fire fighting operations.

(3) "Fire fighting equipment" means any of the following:

- (a) Portable extinguishers.
- (b) Fixed fire equipment.
- (c) Water barrels and pails.
- (d) Standpipes.
- (e) Fire hose.
- (f) Fire alarms.

(4) "Fire protection" means to provide fire fighting equipment, training, and evacuation plans.

(5) "Fire resistance" means that quality of a material that renders it so resistant to fire that, for a specified time and under conditions of a standard heat intensity, the material will not fail structurally and will not permit the side away from the fire to become hotter than a specified temperature. For purposes of this part, fire resistance shall be determined by the fire test of building construction and materials, as prescribed in The National Fire Protection Association Standard NFPA 251, "Standard Methods Of Fire Testing Of Building Construction And Materials," 1990 edition, which is adopted by reference in R 408.41802.

(6) "Fixed fire equipment" means a fire extinguishing system that is permanently mounted and portable portions of a system, such as a hose and nozzle attached to a fixed supply of extinguishing agent.

(7) "Flammable" means to ignite easily and burn intensely or means to have a rapid rate of flame spread.

(8) "Flammable liquid" means any liquid having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100 °F (37.8 °C) and having a flashpoint at or below 199.4 °F (93 °C). Flammable liquids are divided into the following categories:

(a) Category 1 shall include liquids having flashpoints below 73.4 °F (23 °C) and having a boiling point at or below 95 °F (35 °C).

(b) Category 2 shall include liquids having flashpoints below 73.4 °F (23 °C) and having a boiling point above 95 °F (35 °C).

(c) Category 3 shall include liquids having flashpoints at or above 73.4 °F (23 °C) and at or below 140 °F (60 °C).

(d) Category 4 shall include liquids having flashpoints above 140 °F (60 °C) and at or below 199.4°F (93 °C).

(9) "Flash point of the liquid" means the temperature at which it gives off vapor sufficient to form an ignitable mixture with the air near the surface of the liquid within the vessel used as determined by appropriate test procedure and apparatus as follows:

(a) The flashpoint of liquids having a viscosity less than 45 Saybolt Universal Second(s) at 100° F (37.8 °C) and a flashpoint below 175 °F (79.4 °C) shall be determined in accordance with ASTM D56 "Standard Test Method for Flash Point by Tag Closed Cup Tester," 1969 edition, as adopted by reference in R 408.41802, or an equivalent method as defined in Construction Safety Standard Part 42 "Hazard Communication," Appendix B, as referenced in R 408.41802.

(b) The flashpoints of liquids having a viscosity of 45 Saybolt Universal Second(s) or more at 175 °F (79.4 °C) or higher shall be determined in accordance with ASTM D93 "Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester," 1969 edition, as adopted by reference in R 408.41802, or an equivalent method as defined in Construction Safety Standard Part 42 "Hazard Communication," Appendix B, as referenced in R 408.41802.

R 408.41838 Definitions; L to V.

Rule 1838. (1) "Liquefied petroleum gas," "L.P.G.," or "L.P. gas" means any material that is composed predominately of any of the following hydrocarbons or mixtures of hydrocarbons:

- (a) Propane.
- (b) Propylene.
- (c) Butane.
- (d) Isobutene.
- (e) Butylene.

(2) "Means of egress" means a continuous path of travel from any part within a building to the open air outside at ground level.

(3) "Portable tank" means a closed container that has a liquid capacity of more than 60 United States gallons, which is not intended for fixed installation.

(4) "Safety can" means an approved metal or nonmetallic closed container that has a capacity of not more than 5 gallons, that has a flash-arresting screen, spring-closing lid and spout cover, and that is designed so that it will safely relieve internal pressure when exposed to fire.

(5) "Temporary building" means a structure erected or placed for a period not longer than the project construction time.

(6) "Temporary heating device" means a heating unit to provide heat for a period not longer than the project construction time.

(7) "Vapor pressure" means the pressure, measured in pounds per square inch (absolute), exerted by a volatile liquid.

R 408.41841 Employer responsibility.

Rule 1841. (1) An employer shall be responsible for the development of a fire protection program to be followed throughout all phases of the construction and demolition work, and the employer shall provide the firefighting equipment as specified in these rules. As fire hazards occur, there shall be no delay in providing the necessary equipment.

(2) The fire protection portion of the program shall include all of the following:

(a) Establishing and maintaining a means of egress from all areas of the building occupied by employees to provide free and unobstructed egress from all parts of the building or structure at all times when the building or structure is occupied. A lock or fastening that prevents free escape from the inside of any building shall not be installed, except in mental, penal, or corrective institutions where supervisory personnel is continually on duty and effective provisions are made to remove occupants in case of fire or other emergency.

(b) Posting fire rules or, by other means, informing the employees of the evacuation signal, escape routes, and emergency phone numbers. Exits shall be marked by a readily visible sign. Access to exits shall be marked by readily visible signs in all cases where the exit or way to reach the exit is not immediately visible to the occupants.

(c) A requirement that means of egress shall be continually maintained free of all obstructions or impediments to full instant use in the case of fire or other emergency.

(3) The fire prevention portion of the program shall include both of the following:

(a) A housekeeping policy designed to keep a means of egress free from the accumulation of stored materials and debris and to reduce the likelihood of fire.

(b) A policy for the storage of combustible and flammable liquids and materials and for the use of proper heating equipment as prescribed in this part.

(4) The employer shall provide fire fighting equipment and meet all of the applicable requirements of this part as to location, accessibility, inspection, testing, and maintenance. The employer shall immediately replace defective equipment.

(5) As warranted by the project, the employer shall provide a trained and equipped firefighting organization, Fire Brigade, to assure adequate protection to life.

(6) Fire walls and exit stairways, required for the completed buildings, shall be given construction priority. Fire doors, with automatic closing devices, shall be hung on openings as soon as practicable.

(7) Fire cutoffs shall be retained in buildings undergoing alterations or demolition until operations necessitate their removal.

FIRE PROTECTION

R 408.41851 Portable fire extinguishing equipment; selection and installation.

Rule 1851. (1) All portable fire extinguishers shall bear an approved label of a nationally recognized testing laboratory. A fire extinguisher or extinguishing device that contains an active agent or propellant that has thermal decomposition products that have a level of vapor toxicity equal to or greater than any of the following listed materials shall not be used, installed for use, or allowed to remain installed for use:

- (a) Carbon tetrachloride, CCL4.
- (b) Chlorobromomethane, CH₂ BrCL.
- (c) Azeotropic chlormethane, CM7.
- (d) Dibromodifluoromethane, CBr₂F₂.
- (e) 1, 2-dibromo-2-chloro-1, 1, 2-trifluoroethane, Cbr-F₂, CBrCLf.

(f) 1, 2-dibromo-2, 2-difluoroethane, CH₂BrCbrF₂.

- (g) Methylbromide, CH₃Br.
- (h) Ethylene dibromide, CH₂BrCH₂Br.
- (i) Hydrogen bromide, HBr.
- (j) Methylene bromide, CH₂Br₂.
- (k) Bromodifluoromethane, CHBrF₂.

(2) A fire extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of the protected building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet.

(3) One or more fire extinguishers, rated not less than 2A, shall be provided on each floor. In multistory buildings, at least 1 fire extinguisher shall be located adjacent to stairway.

(4) Fire fighting equipment shall be located where it will be readily seen and accessible along normal paths of travel in the protected area.

(5) One 55-gallon open drum of water and 2 fire pails may be substituted for a fire extinguisher that has a 2A rating. Extinguishers and water drums, subject to freezing, shall be protected from freezing.

(6) A 1/2 inch or larger interior diameter garden hose that is not more than 100 feet in length and that is equipped with a nozzle may be substituted for a 2A fire extinguisher if it is capable of reaching all points in the area that would be covered by the replaced extinguisher and is capable of discharging not less than 5 gallons per minute with a horizontal hose stream of not less than 30 feet. The hose line shall be mounted on a rack or reel. Not more than 1/2 of the total number of required fire extinguishers may be replaced by the hose.

(7) In addition to the requirements of this rule, fire extinguishers shall be supplied as follows:

(a) Not less than 1 portable fire extinguisher that has a rating of not less than 20 BC units shall be located as follows:

(i) Outside of, but not more than 10 feet from, a door opening to a room used for the storage of more than 60 gallons of flammable liquids.

(ii) Not less than 25 feet, nor more than 75 feet, from an outside storage area.

(iii) On each tank truck or other vehicle used to transport or dispense flammable liquids.

(iv) A fire extinguisher, rated not less than 10B, shall be provided within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used on the jobsite. This requirement does not apply to the integral fuel tanks of motor vehicles.

(b) Each service or fueling area shall have at least 1 portable fire extinguisher which has not less than a 20 BC unit rating and which is located within 75 feet of each pump, dispenser, underground fill opening, and lubricating or service area.

(c) Storage locations for liquefied petroleum gas (L.P.G.) shall be provided with at least 1 approved portable fire extinguisher that has a rating of not less than 20 BC.

(d) Each site of a hazardous process shall be provided with a portable fire extinguisher of an appropriate size and type. Other means for safety or control may be provided if approved or required by the process.

(8) Table 1 may be used in selecting and providing an extinguisher.

(9) Table 1 reads as follows:

TABLE 1		
HAZARD	DESCRIPTION	EXTINGUISHER TYPE AND CONTENTS
Class "A" Fire	Combustible Material	Loaded stream, Multipurpose dry chemical, Pressure-operated water, Water pump tanks, Water mist, Halon 1211.
Class "B" Fire	Flammable Liquids, Gas, Or Grease	Carbon dioxide, Dry chemical, Foam, Loaded stream, Multipurpose dry chemical, Halon 1211.
Class "C" Fire	Electrical Equipment	Carbon dioxide with plastic horn only, Dry chemical, Multipurpose dry chemical, Water mist, Halon 1211.
Class "D" Fire	Combustible Metal	Extinguishing agent listed for use on a specific combustible metal hazard.

R 408.41852 Portable fire extinguishers.

Rule 1852. Portable fire extinguishers shall be inspected periodically and maintained in accordance with NFPA 10A "Maintenance and Use of Portable Fire Extinguishers," 1970 edition, as adopted by reference in R 408.41802.

R 408.41853 Fixed fire equipment.

Rule 1853. (1) Sprinkler protection shall be as follows:

(a) If the facility being constructed includes the installation of automatic sprinkler protection, the installation shall closely follow the construction and be placed in service as soon as applicable laws permit following completion of each story.

(b) In all structures in which standpipes are required, or where standpipes exist in structures being altered, they shall be brought up as soon as applicable laws permit, and shall be maintained as construction progresses in such a manner that they are always ready for fire protection use. The standpipes shall be provided with Siamese fire department connections on the outside of the structure, at the street level, which shall be conspicuously marked.

(2) During demolition or alterations, an existing sprinkler or standpipe system shall be maintained in service in any portion of a structure that is not subject to demolition or alteration. The operation of a sprinkler control valve shall be permitted only by a properly authorized person. Modification of a sprinkler system to permit alterations or additional demolition shall be expedited so that the automatic protection may be returned to service as quickly as possible.

Sprinkler control valves shall be checked daily at the close of work to ascertain whether the protection is in service. When the sprinkler or standpipe system is out of service for other than routine maintenance, the local fire department and the building manager or designated representative shall be notified. A sign shall be posted on each fire department connection that is out of service and the balance of the service shall be tested and resealed in operable condition, where required, and both the fire department and the building manager or designated representative shall be advised that the system is again in service.

(3) A standpipe and hose system shall have not less than 1 outlet per story.

(4) An automatic sprinkler system shall be installed and maintained as prescribed in The National Fire Protection Association Standards NFPA 13 "Installation of Sprinkler Systems," 1991 edition; NFPA 14 "Standard For The Installation Of Standpipe, Private Hydrants And Hose Systems," 2000 edition; and NFPA 25 "Inspection, Testing, And Maintenance Of Water-Based Fire Protection Systems," 1998 edition. The standards are adopted by reference in R 408.41802.

R 408.41854 Water supply.

Rule 1854. (1) An employer shall make available temporary or permanent water supply, of sufficient volume, duration, and pressure, required to properly operate the firefighting equipment as soon as combustible materials accumulate.

(2) Where an underground water main is to provide water for fire protection equipment, the main shall be installed, completed, and made available for use as soon as practicable.

R 408.41855 Fire hose and connections.

Rule 1855. (1) One-hundred feet or less of 1-1/2 inch hose, with a nozzle capable of discharging water at 25 gallons or more per minute supplied from an approved standpipe system may be substituted for a fire extinguisher rated not more than 2A in the designated area provided that the hose line can reach all points in the area.

(2) The employer shall contact the local fire fighting organization to assure that fire hose connections on the jobsite are compatible with their fire fighting equipment. If a connection is not compatible, the employer shall install an adapter, or equivalent, to permit connection of local fire fighting equipment.

(3) During demolition involving combustible materials, charged hose lines, supplied by hydrants, water tank trucks with pumps, or equivalent, shall be made available.

R 408.41856 Fire alarms.

Rule 1856. An alarm system shall be established whereby all employees on the site can be alerted for an emergency. The signaling device shall be audible throughout the structure.

FIRE PREVENTION

R 408.41861 Ignition hazards.

Rule 1861. (1) Internal combustion engine powered equipment shall be so located that the exhaust piping is at a distance away from flammable and combustible materials to prevent ignition. When the exhaust is piped to outside the building under construction, a clearance of not less than 6 inches shall be maintained between the piping and flammable and combustible material.

(2) Smoking shall be prohibited within 25 feet of flammable material. The area shall be posted with a sign "No Smoking or Open Flame." The sign shall be as prescribed in the Construction Safety Standard Part 22 "Signals, Signs, Tags and Barricades," as referenced in R 408.41802.

(3) Electrical wiring equipment and portable battery-powered lighting equipment used in connection with the storage, handling, or use of flammable material shall be of the type approved for the hazardous location.

(4) The nozzle of an air, inert gas, and steam line or hose, when used in the cleaning or ventilation of tanks and vessels that contain flammable gases or vapors, shall be bonded to the tank or vessel shell.

(5) When a hazardous concentration of flammable gas or vapor exists in the area outside of the tank or vessel, the external bonding connection shall be made to the tank or vessel with the non-sparking device. The final bonding connection shall be made outside the hazardous concentration.

R 408.41861a Location of containers.

Rule 1861a. (1) Containers shall be in a suitable ventilated enclosure or otherwise protected against tampering.

(2) The quantity of flammable liquids kept in the vicinity of spraying operations shall be the minimum required for operations and should ordinarily not exceed a supply for 1 day or 1 shift.

(3) Bulk storage of portable containers of flammable liquids shall be in a separate, constructed building detached from other important buildings or cut off in a standard manner.

(4) Containers shall be upright upon firm foundations or otherwise firmly secured.

(5) The possible effect on the outlet piping of settling shall be guarded against by a flexible connection or special fitting.

(6) LP-gas containers with a water capacity per container of more than 125 gallons shall be located a minimum of 10 feet from the nearest building or group of buildings when in use.

R 408.41861b Temporary buildings.

Rule 1861b. (1) A temporary building shall not be erected where it will adversely affect a means of egress.

(2) Temporary buildings, when located within another building or structure, shall be of either noncombustible construction or of combustible construction having a fire resistance of not less than 1 hour.

(3) Temporary buildings, located other than inside another building and not used for the storage, handling, or use of flammable or combustible liquids, flammable gases, explosives, or blasting agents, or similar hazardous occupancies, shall be located at a distance of not less than 10 feet from another building or structure.

(4) Groups of temporary buildings not exceeding 2,000 square feet in aggregate, shall, for the purposes of these rules, be considered a single temporary building.

R 408.41861c Open yard storage.

Rule 1861c. (1) Combustible materials shall be piled with due regard to the stability of piles and in no case higher than 20 feet.

(2) Driveways between and around combustible storage piles shall be at least 15 feet wide and maintained free from accumulation of rubbish, equipment, or other articles or materials.

(3) Driveways shall be so spaced that a maximum grid system unit of 50 feet by 150 feet is produced.

(4) The entire storage site shall be kept free from accumulation of unnecessary combustible materials. Weeds and grass shall be kept down and a regular procedure provided for the periodic cleanup of the entire area.

(5) When there is a danger of an underground fire, that land shall not be used for combustible or flammable storage.

(6) Method of piling shall be solid wherever possible and in orderly and regular piles. No combustible material shall be stored outdoors within 10 feet of a building or structure.

(7) Portable fire extinguishing equipment suitable for the fire hazard involved shall be provided at convenient, conspicuously accessible locations in the yard area. Portable fire extinguishers rated not less than 2A shall be placed so that maximum travel distance to the nearest unit shall not exceed 100 feet.

R 408.41861d Indoor storage.

Rule 1861d. (1) Storage shall not obstruct, or adversely affect, means of exit.

(2) All materials shall be stored, handled, and piled with due regard to their fire characteristics.

(3) Noncompatible materials that may create a fire hazard shall be segregated by a barrier having a fire resistance of at least 1 hour.

(4) Material shall be piled to minimize the spread of fire internally and to permit convenient access for firefighting. Stable piling shall be maintained at all times. Aisle space shall be maintained to safely accommodate the widest vehicle that may be used within the building for firefighting purposes.

(5) Clearance of at least 36 inches shall be maintained between the top level of the stored material and the sprinkler deflectors.

(6) Clearance shall be maintained around lights and heating units to prevent ignition of combustible materials.

(7) A clearance of 24 inches shall be maintained around the path of travel of fire doors unless a barricade is provided in which case no clearance is needed.

(8) Material shall not be stored within 36 inches of a fire door opening.

FLAMMABLE LIQUIDS

R 408.41862 Transportation of flammable liquids.

Rule 1862. (1) Only approved containers and portable tanks shall be used for storage and handling of flammable liquids.

(2) Approved safety cans or department of transportation approved containers shall be used for the handling and use of flammable liquids in quantities of 5 gallons or less, except that this does not apply to those flammable liquid materials that are highly viscid (extremely hard to pour), which may be used and handled in original shipping containers.

(3) For quantities of 1 gallon or less, the original container may be used for storage, use, and handling of flammable liquids.

R 408.41863 Inside storage.

Rule 1863. (1) Not more than 25 gallons of flammable liquid shall be stored within a room outside of an approved wood or metal cabinet. For storage of liquefied petroleum gas, see R 408.41877.

(2) Not more than 60 gallons of category 1, 2, and/or 3 flammable liquids or 120 gallons of category 4 flammable liquids shall be stored in any 1 storage cabinet. Not more than 3 such cabinets shall be located in a single storage area. Quantities in excess of this shall be stored in an inside storage room as prescribed in R 408.41864

(3) A wood cabinet, when used to store flammable liquids, shall have the bottom, back, sides, and top constructed of not less than 1-inch exterior plywood which shall not break down or delaminate under fire test conditions. All joints shall be rabbeted and secured in 2 directions by flathead wood screws. When more than 1 door is provided, there shall be a rabbeted overlap of not less than 1 inch. Steel hinges shall be mounted so that the holding capacity is not lost due to loosening or burnout of the screws. The cabinet shall be painted inside and out with a fire-retardant paint.

(4) A cabinet used to store flammable liquids shall be labeled with conspicuous lettering,

"Flammable Keep Away from Open Flames"

as prescribed in the Construction Safety Standard Part 22 "Signals, Signs, Tags and Barricades," as referenced in R 408.41802.

(5) A flammable liquid shall not be stored in a building in an area used as a means of egress.

R 408.41864 Inside storage room.

Rule 1864. (1) An inside storage room shall be constructed to meet the required fire resistance rating for its use. The construction shall meet the test specifications in The National Fire Protection Association Standard NFPA 251 "Standard Methods of Fire Testing of Building Construction and Materials," 1990 edition, which is adopted by reference in R 408.41802.

(2) Openings from an inside storage room to another room or building shall be provided with noncombustible liquid-tight raised sills or ramps at least 4 inches in height or else the floor in the storage area shall be at least 4 inches below the surrounding floor. Openings shall be provided with approved self-closing fire doors.

(3) If wood shelving, racks, dunnage, or floor overlay is used in the room, it shall be not less than 1 inch nominal thickness.

(4) Where other portions of the building or other buildings are exposed, windows shall be protected in accordance with NFPA 80 "Standard for Fire Doors and Windows," 1970 edition, for Class E or F openings, as adopted in R 408.41802.

(5) A material that will react with water to create a fire hazard shall not be stored in the same room with a flammable liquid.

(6) Quantities of flammable liquids stored in an inside storage room shall be limited in accordance with the criteria prescribed in table 3.

(7) Every inside storage room shall be provided with either a gravity or a mechanical exhausting system and meet all of the following provisions:

(a) A switch located outside of the door of the inside storage room shall control the mechanical exhausting system and any lighting fixtures.

(b) An electric pilot light shall be installed adjacent to the switch if category 1, 2, or 3 flammable liquids are dispensed within the room.

(c) The exhausting system shall commence not more than 12 inches above the floor and be designed to provide for a complete change of air within the room not less than 6 times per hour when flammable liquids are stored in the room.

(d) Where gravity ventilation is provided, the fresh air intake, as well as the exhausting outlet from the room, shall be on the exterior of the building in which the room is located.

(8) An inside storage room shall have at least 1 aisle which shall be not less than 3 feet in width and which shall be maintained free of obstructions.

(9) Containers that have more than a 30-gallon capacity shall not be stacked one upon another.

(10) Table 3 reads as follows:

TABLE 3			
INSIDE STORAGE ROOM			
Fixed Fire Protection Provided	Fire Resistance Rating of Room	Maximum Size Of Storage Area	Total Allowable Quantities Gallons/Square Foot/Floor Area
Yes	2 hours	500 square feet	10
No	2 hours	500 square feet	4
Yes	1 hour	150 square feet	5
No	1 hour	150 square feet	2
NOTE: Fire protection system shall be sprinkler, water spray, carbon dioxide, or other system approved by a nationally recognized testing laboratory for this purpose.			

R 408.41865 Outside storage.

Rule 1865. (1) Containers of flammable liquids with not more than 60 gallons in each container shall not be stored in excess of 1,100 gallons in any outside storage area.

(2) Portable tanks stored outside shall not be closer than 20 feet from any building. Two or more portable tanks, grouped together, having a combined capacity in excess of 2,200 gallons, shall be separated by a 5-foot clear area. Individual portable tanks exceeding 1,100 gallons shall be separated by a 5-foot clear area. Piles or groups of containers shall be separated by a 5-foot clearance.

(3) Within 200 feet of each portable tank, there shall be a 12-foot wide access way to permit approach of fire control apparatus.

(4) A flammable liquid in an outdoor storage area shall be stored not less than 20 feet from a building.

(5) Within 200 feet of each pile or group of flammable containers, a 12-foot wide access way shall be maintained to permit the approach of fire control equipment.

(6) An outside storage area for flammable liquids shall be graded in a manner to divert a possible spill away from a building or other hazard, or shall be surrounded by a curb or earth dike not less than 12 inches high. When a curb or dike is used, provisions shall be made to drain off accumulations of water or a spill of a flammable liquid in such a manner that the spill cannot create a hazard for an employee.

The drains shall terminate in a location that will not create another hazard.

(7) An outside storage area for flammable liquid shall be kept free of weeds, papers, debris, and other combustibles not necessary to the storage.

(8) An above ground tank or loading operation shall not be installed closer than 25 feet plus 1 inch per 1,000 volts, measured horizontally, from the center line of electric power lines, or under an electric power line, except that service entrance and service lines may be closer than 25 feet but not over the tanks or loading area. This prohibition shall not apply to a fuel oil tank with up to a 275-gallon individual capacity or a 550-gallon aggregate capacity that is used for heating purposes.

(9) A flammable or combustible liquid outdoor storage area shall not occupy any area used as a means of egress.

(10) Underground tanks shall not be abandoned.

R 408.41866 Portable tanks and emergency venting.

Rule 1866. (1) A portable tank that has a capacity of 660 gallons or less of flammable liquid shall be in compliance with emergency venting and other devices, as required by chapters III, IV, and V of The National Fire Protection Association Standard NFPA 30, "Flammable and Combustible Liquids Code," 1996 edition, which is adopted by reference in R 408.41802.

(2) A portable tank that has a capacity of more than 660 gallons of flammable or combustible liquid shall have emergency venting and other devices, as required by chapters II and III of The National Fire Protection Association Standard NFPA 30, "Flammable and Combustible Liquids Code," 1996 edition, which is adopted by reference in R 408.41802.

(3) An employer shall contact the Michigan Department of Licensing and Regulatory Affairs, Bureau of Fire Services, Storage Tank Division, for additional rules concerning the installation, use, and storage of liquefied petroleum gases. The Storage Tank Division can be reached at 3101 Technology Blvd, Suite H, Lansing, Michigan, 48910; telephone number: 517.335.7211 or via the internet at website: www.michigan.gov/storagetanks

R 408.41867 Dispensing.

Rule 1867. (1) An area where a flammable liquid is transferred at 1 time, in a quantity of more than 5 gallons from 1 tank or container to another tank or container, shall be separate from other operations or a building by a distance of 25 feet or by a wall not less than 5 feet high having a fire resistance of not less than 1 hour.

(2) Provisions shall be made to neutralize spills of flammable liquids. Natural or mechanical ventilation shall be capable of maintaining vapor below 10% of the lower explosive limit.

(3) Transfer of a category 1, 2, or 3 flammable liquid from 1 container to another shall be done only when the containers are electrically bonded.

(4) A flammable liquid shall be transferred from or drawn into containers by 1 of the following:

(a) Through a closed piping system.

(b) From a safety can.

(c) By a device drawing through the top from a closed container or portable tank, by gravity or a pump, through a self-closing valve. Air pressure shall not be used.

(5) A dispensing device, hose, and nozzle for category 1, 2, or 3 flammable liquids shall be an approved type.

(6) The dispensing units shall be protected from collision damage.

R 408.41868 Handling at point of use.

Rule 1868. (1) Not more than 1 day's supply, but not to exceed 25 gallons of flammable liquid, shall be permitted to stand outside a cabinet at a place of usage.

(2) A category 1, 2, or 3 flammable liquid shall not be used where there is an open flame or source of ignition within 50 feet of the liquid, unless conditions warrant greater clearance.

(3) Leakage or spillage of a flammable liquid shall be disposed of without creating another hazard.

(4) Natural or mechanical ventilation capable of maintaining the vapor below 10% of the lower explosive limit shall be provided and used when a flammable liquid is used or handled.

(5) Category 1, 2, or 3 flammable liquids shall be kept in closed containers when not in use.

R 408.41869 Service and refueling areas.

Rule 1869. (1) A tank truck shall be designed, constructed, and maintained as prescribed in The National Fire Protection Association Standard NFPA 385 "Standard For Tank Vehicles For Flammable and Combustible Liquids," 1990 edition, which is adopted by reference in R 408.41802.

(2) The dispensing hose shall be an approved type.

(3) The dispensing nozzle shall be an approved automatic-closing type without a latch-open device.

(4) An emergency switch that is clearly identified and accessible shall be available to shut off all power to all dispensing devices in an emergency and shall be in a location that is remote from the dispensing device.

(5) Sources of ignition, such as smoking, open flame, cutting and welding, frictional heat, sparks, and heating equipment, shall not be permitted within 25 feet in any direction of where an internal combustion engine is fueled or where a flammable liquid is dispensed.

(6) A warning sign prohibiting smoking shall be posted as prescribed in Construction Safety Standard Part 22 "Signals, Signs, Tags, and Barricades," as referenced in R 408.41802.

(7) The motor of any equipment being fueled shall be shut off during the fueling operation.

(8) Flammable liquids shall be stored in approved closed containers, in tanks located underground, or in aboveground portable tanks.

LIQUEFIED PETROLEUM GAS

R 408.41871 Rescinded.

R 408.41872 Rescinded.

R 408.41873 L. P. safety devices.

Rule 1873. (1) Every container and every vaporizer shall be provided with 1 or more approved safety relief valves or devices. These valves shall be arranged to afford free vent to the outer air with discharge not less than 5 feet away, horizontally, from any opening into a building which is below such a discharge.

(2) Shutoff valves shall not be installed between the safety relief device and the container, or the equipment or piping to which the safety relief device is connected, except that a shutoff valve may be used where the arrangement of this valve is such that the full required capacity flow through the safety relief device is always afforded.

(3) Container safety relief devices and regulator relief vents shall be located not less than 5 feet in any direction from air openings into sealed combustion system appliances or mechanical ventilation air intakes.

R 408.41874 L. P. gas appliances.

Rule 1874. (1) LP-Gas consuming appliances shall be approved types.

(2) Any appliance that was originally manufactured for operation with a gaseous fuel other than LP-Gas, and is in good condition, may be used with LP-Gas only after it is properly converted, adapted, and tested for performance with LP-Gas before the appliance is placed in use.

R 408.41875 L.P. containers and equipment.

Rule 1875. (1) Containers in use shall be in compliance with all of the following provisions:

(a) Each system shall have containers, valves, connectors, manifold valve assemblies, and regulators of an approved type.

(b) Filling of fuel containers for trucks or motor vehicles from bulk storage containers shall be performed not less than 10 feet from the nearest masonry-walled building, or not less than 25 feet from the nearest building or other construction and, in any event, not less than 25 feet from any building opening.

(c) Filling of portable containers or containers mounted on skids from storage containers shall be performed not less than 50 feet from the nearest building.

(d) All of the following provisions apply to multiple container systems:

(i) Valves in the assembly of multiple container systems shall be arranged so that replacement of containers can be made without shutting off the flow of gas in the system. This provision shall not be construed as requiring an automatic changeover device.

(ii) Heaters shall be equipped with an approved regulator in the supply line between the fuel cylinder and the heater unit. Cylinder connectors shall be provided with an excess flow valve to minimize the flow of gas in the event the fuel line becomes ruptured.

(iii) Regulators and low-pressure relief devices shall be rigidly attached to the cylinder valves, cylinders, supporting standards, the building walls, or otherwise rigidly secured, and shall be so installed or protected from the elements.

(2) When damage to LP-Gas systems from vehicular traffic is a possibility, the employer shall ensure that precautions against such damage are taken.

(3) Piping, pipe and tubing fittings, and valves used to supply utilization equipment within the scope of this standard shall be acceptable for services as approved by the manufacture of the equipment.

(4) Welding is prohibited on containers.

(5) Valves, fittings, and accessories connected directly to the container, including primary shut off valves, shall have a rated working pressure of at least 250 p.s.i.g. and shall be of material and design suitable for LP-Gas service.

(6) Connections to containers, except safety relief connections, liquid level gauging devices, and plugged openings, shall have shutoff valves located as close to the container as practicable.

(7) All cylinders shall meet the provisions of the Department of Transportation Title 49 C.F.R. Part 178, "Shipping Container Specifications," as adopted in R 408.41802.

(8) When operational requirements make portable use of containers necessary, and their location outside of buildings or structures is impracticable, containers and equipment shall be permitted to be used inside of buildings or structures in accordance with R 408.41884 (12), (13), and (16), and the following rules:

(a) Systems utilizing containers having a water capacity greater than 2 1/2 pounds, nominal 1 pound LP-Gas capacity, shall be equipped with excess flow valves. Such excess flow valves shall be either integral with the container valves or in the connections to the container valve outlets.

(b) Regulators shall be either directly connected to the container valves or to manifolds connected to the container valves. The regulator shall be suitable for use with LP -Gas. Manifolds and fittings connecting containers to pressure regulator inlets shall be designed for not less than 250 p.s.i.g. service pressure.

(c) Valves on containers having water capacity greater than 50 pounds, nominal 20 pounds LP-Gas capacity, shall be protected from damage while in use or storage.

(d) Aluminum piping or tubing shall not be used.

(e) Hose shall be designed for a working pressure of at least 250 p.s.i.g. Design, construction, and performance of hose, and hose connections shall have their suitability determined by listing by a nationally recognized testing agency. The hose length shall be as short as practicable. Hoses shall be long enough to permit compliance with spacing provisions of this rule and R 408.41884 (6), (7), (8), (12), (13), and (16), without kinking or straining, or causing hose to be so close to a burner as to be damaged by heat.

(f) Containers having a water capacity greater than 2 1/2 pounds, nominal 1 pound LP-Gas capacity, connected for use shall stand on a firm and substantially level surface and, when necessary, shall be secured in an upright position.

(g) The maximum water capacity of individual containers shall be 245 pounds (nominal 100 pounds L.P. gas capacity).

R 408.41876 Rescinded.

R 408.41877 Storage of LPG containers.

Rule 1877. (1) This rule applies to the storage of portable containers whether filled or empty if they have been in service.

(2) Storage of L.P. gas within buildings is prohibited.

(3) Storage outside of buildings, for containers awaiting use, shall be located away from the nearest building or group of buildings as specified in table 4.

(4) Table 4 reads as follows:

(5) Containers shall be stored within a suitable ventilated enclosure or otherwise protected against tampering, and located as specified in table 4.

(6) When L.P. gas and 1 or more other gases are stored or used in the same area, the containers shall be marked to identify their content. Marking shall be in compliance with The Compressed Gas Association Standard CGA C7 "Guide To The Preparation Of Precautionary Labeling And Marking Of Compressed Gas Containers," 2000 edition, which is adopted by reference in R 408.41802.

TABLE 4	
QUANTITY OF L.P. GAS STORED	DISTANCE (FEET) FROM A BUILDING
500 lbs. or less	0
501 to 6,000 lbs.	10
6,001 to 10,000 lbs.	20
over 10,000 lbs.	25

R 408.41877a Systems utilizing containers other than DOT containers.

Rule 1877a. (1) This rule applies specifically to systems utilizing storage containers other than those constructed in accordance with DOT specifications. R 408.41875(4) applies to this rule unless otherwise noted in R 408.41875(4).

(2) Storage containers shall be designed and classified in accordance with Table 5

(3) Containers with foundations attached, portable or semiportable b containers with suitable steel "runners" or "skids" and popularly known in the industry as "skid tanks," shall be designed, installed, and used in accordance with these rules subject to the following provisions:

(a) If they are to be used at a given general location for a temporary period not to exceed 6 months they need not have fire-resisting foundations or saddles but shall have adequate ferrous metal supports.

(b) They shall not be located with the outside bottom of the container shell more than 5 feet, 1.52 m, above the surface of the ground unless fire-resisting supports are provided.

(c) The bottom of the skids shall not be less than 2 inches, 5.08 cm, or more than 12 inches, 30.48 cm, below the outside bottom of the container shell.

(d) Flanges, nozzles, valves, fittings, and the like, having communication with the interior of the container, shall be protected against physical damage.

(e) When not permanently located on fire-resisting foundations, piping connections shall be sufficiently flexible to minimize the possibility of breakage or leakage of connections if the container settles, moves, or is otherwise displaced.

(f) Skids, or lugs for attachment of skids, shall be secured to the container in accordance with the code or rules under which the container is designed and built, with a minimum factor of safety of 4, to withstand loading in any direction equal to 4 times the weight of the container and attachments when filled to the maximum permissible loaded weight.

(4) Field welding where necessary shall be made only on saddle plates or brackets that were applied by the manufacturer of the tank.

TABLE 5			
Container Type	For gases with vapor press. Not to exceed lb. per sq. in. gage at 100 deg. F. (37.8 deg. C.)	MINIMUM DESIGN PRESSURE OF CONTAINER, LB. PER SQ. IN. GAGE	
		1949 and earlier editions of ASME Code (Par. U-68, U-69)	1949 edition of ASME Code (Par. U-200, U-201); 1950, 1952, 1956, 1959, 1962, 1965, and 1968 (Division 1) editions of ASME Code; All editions of API-ASME Code(3)
80(1)	80(1)	80 (1)	100 (1)
100	100	100	125
125	125	125	156
150	150	150	187
175	175	175	219
200(2)	215	200	250
Footnote (1) New storage containers of the 80 type have not been authorized since Dec. 31, 1947.			
Footnote (2) Container type may be increased by increments of 25. The minimum design pressure of containers shall per 100 percent of the container type designation when constructed under 1949 or earlier editions of the ASME Code (Par. U-68 and U-69). The minimum design pressure of containers shall be 125 percent of the container type designation when constructed under: (1) the 1949 ASME Code (Par. U-200 and U-201), (2) 1950, 1952, 1956, 1959, 1962, 1965, and 1968 (Division 1) editions of the ASME Code, and (3) all editions of the API-ASME Code.			
Footnote (3) Construction of containers under the API-ASME Code is not authorized after July 1, 1961.			

R 408.41878 Rescinded.

R 408.41879 Rescinded.

R 408.41881 Rescinded.

R 408.41882 Rescinded.

R 408.41883 Rescinded.

TEMPORARY HEATING DEVICES

R 408.41884 Heating devices.

Rule 1884. (1) Fresh air shall be supplied in sufficient quantities to maintain the health and safety of workmen. Where natural means of fresh air supply is inadequate, mechanical ventilation shall be provided.

(2) When heaters are used in confined spaces, special care shall be taken to provide sufficient ventilation in order to ensure proper combustion, maintain the health and safety of workmen, and limit temperature rise in the area.

(3) A temporary heating device shall not be located less than 50 feet from a point where a flammable liquid is used or dispensed.

(4) A temporary heating device that is set on a combustible floor shall be separated from the floor by an insulating material or 1 inch of concrete. The insulating material shall extend not less than 2 feet beyond the heater in all directions.

(5) A temporary heating device shall be located not less than 10 feet from a combustible covering, such as, but not limited to, canvas or tarpaulins, unless the covering is fastened to prevent its dislodgement due to wind action.

(6) A temporary heating device using L.P. gas, other than in an integral heater-container unit, shall be located not less than 6 feet from any L.P. gas container.

(7) Integral heaters may be used if designed and installed so as to prevent direct or radiant heat application to the container.

(8) Blower-and radiant-type units shall not be directed toward any L.P. gas container that is less than 20 feet away.

(9) If 2 or more heater units are located within the same unpartitioned area, then the containers of each unit shall be separated from the containers of any such other unit by not less than 20 feet.

(10) If containers are manifolded together and serve 1 heater on the same floor, then the total water capacity of the containers shall not be more than 735 pounds (nominal 300 pounds L.P. gas capacity). If more than 1 such manifold is used they shall be separated by not less than 20 feet.

(11) Heating devices, including portable heaters and salamanders using a liquid flammable fuel such as, but not limited to, fuel oil or kerosene, shall be equipped with an approved automatic shutoff safety control device which will, in the event of flame failure, shut off the flow of fuel to the main burner and pilot if used. The device shall not be relit while the combustion chamber is hot.

(12) Portable heaters including salamanders shall be equipped with an approved automatic device to shut off the flow of gas to the main burner, and pilot if used, in the event of flame failure. Such heaters, having inputs above 50,000 British thermal unit's (B.T.U.) per hour, shall be equipped with either a pilot, that is lighted and proved before the main burner can be turned on, or an electric ignition system.

NOTE: The provisions of this rule do not apply to tar kettles, hand torches, melting pots, or portable heaters of less than 7,500 British thermal unit's (B.T.U.), if used with 2 1/2 pound containers.

(13) A temporary heating device shall be installed horizontally level.

(14) A solid fuel salamander shall not be used in a building or on a scaffold.

(15) L.P. gas containers valves, connectors, regulators and manifolds, piping, and tubing shall not be used as structural supports for heaters and shall be located to minimize exposure to high temperatures or physical damage.

(16) A heating device, including a temporary heating device, designed for barometric or gravity oil feed shall be used only with an integral tank.

(17) Heaters specifically designed and approved for use with separate supply tanks may be connected for gravity feed, or an automatic pump, from a supply tank.

(18) Heating equipment of an approved type may be installed in the lubrication or service area where there is no dispensing or transferring of category 1, 2, or 3 flammable liquids, provided the bottom of the heating unit is at least 18 inches above the floor and is protected from physical damage.

(19) Heating equipment installed in lubrication or service areas, where category 1, 2, or 3 flammable liquids are dispensed, shall be of an approved type for garages and shall be installed at least 8 feet above the floor.



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