

**Michigan Department of Energy, Labor & Economic Growth**

**2008 Michigan Boiler Code Rules**



Bureau of Construction Codes  
Boiler Division  
P.O. Box 30254  
Lansing, Michigan 48909  
[www.michigan.gov/bcc](http://www.michigan.gov/bcc)

## Introduction

Amendments to the Michigan Boiler Rules become effective July 27, 2009. The rules adopt by reference the American Society of Mechanical Engineers (ASME) 2007 edition and 2008a addenda Boiler and Pressure Vessel codes for the construction and installation of boilers and The National Board of Boiler and Pressure Vessel Inspectors (NBBI) Inspection Code (NBIC) for inspection, installation, and repair of boilers.

**How to use this publication:** The Michigan Boiler Rules are published in parts, i.e., Part 1 General Provisions; Part 2 Existing Installations; Part 3 Inspection and Testing for New Construction; Installation and Alteration of Boilers and Piping; etc. The rules provide amendments to the ASME and NBIC codes. The provisions set forth in the publication are either added to or amend the ASME and NBIC codes.

The ASME Boiler and Pressure Vessel Code 2007 edition and its 2008a addenda are adopted by reference in R 408.4025. The NBIC 2007 edition is adopted by reference in R 408.4024.

**Copies of the rules** are available at no cost by downloading from the bureau website at [www.michigan.gov/bcc](http://www.michigan.gov/bcc) or from the Michigan Department of Energy, Labor & Economic Growth, Bureau of Construction Codes, Boiler Division, P. O. Box 30255, Lansing, Michigan 48909 for a cost of \$10.00. Please make checks payable to the State of Michigan.

The ASME boiler codes may be purchased from ASME by calling 1 (800) 843-2763. The NBIC may be purchased from the National Board by calling 1 (614) 888-8320.

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DEPARTMENT OF ENERGY, LABOR & ECONOMIC GROWTH

DIRECTOR'S OFFICE

MICHIGAN BOILER RULES

Filed with the Secretary of State on May 28, 2009

These rules take effect July 27, 2009

(By authority conferred on the director of the department of energy, labor & economic growth by section 4 of 1965 PA 290, executive reorganization order no. 2008-4, MCL 445.2025)

R 408.4012, R 408.4024, R 408.4025, R 408.4026, R 408.4027, R 408.4031, R 408.4032, R 408.4033, R 408.4038, R 408.4047, R 408.4057, R 408.4058, R 408.4087, R 408.4109, R 408.4114, R 408.4121, R 408.4127, R 408.4171, R 408.4193, R 408.4195, R 408.4197, R 408.4507, and R 408.4701 of the Michigan Administrative Code are amended, and R 408.4186 of the Code is rescinded as follows:

**PART 1. GENERAL PROVISIONS**

**R 408.4001 Scope.**

Rule 1. These rules establish minimum standards of safety for the use, construction, installation, inspection, alteration, and repair of boilers; licensing of boiler inspectors, boiler repairers, and boiler installers; requirements for permits to install, repair, and alter; and fees to be charged.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4012 Definitions.**

Rule 12. (1) "Accident" means a sudden and accidental breakdown of a boiler or a part of a boiler that results in physical damage to the boiler which necessitates the repair or replacement of the boiler or a part of the boiler. "Accident" does not mean a breakdown due to any of the following unless a unique or unusual explosion hazard exists as a result of the breakdown:

- (a) Normal erosion.
  - (b) Corrosion.
  - (c) Wastage of metal that requires restoration.
  - (d) Leaking tubes.
  - (e) Weakened metal, such as water legs or handhole areas.
- (2) "Act" means 1965 PA 290, MCL 408.751 et seq.
- (3) "Aftercooler" means a device used for lowering the temperature of a boiler blowoff discharge before it enters the building drain.
- (4) "Alteration" means any change in the item described on the original manufacturer's data report that affects the pressure-containing capability of the boiler or its piping. A

nonphysical change such as an increase in the maximum allowable working pressure (internal or external) or design temperature of a boiler or its piping is an alteration.

(5) "ASME," "ASME boiler and pressure vessel code," "ASME code," or "code" means the boiler and pressure vessel code of the American Society of Mechanical Engineers, with addenda, as prescribed and approved by the council of the society.

(6) "Authorized inspector" means an individual who is designated as an authorized inspector by an authorized inspection agency, who holds a valid certificate of competency and national board commission with an "A" or "B" endorsement, and who is employed by the authorized inspection agency that assumes responsibility for the individual's actions.

(7) "Board of boiler rules" or "board" means the board created by the act.

(8) "Boiler assembler" means a corporation, company, partnership, or individual who assembles a boiler that has been delivered in pieces. For ASME code section I power boiler assemblies, a boiler assembler shall possess the appropriate code symbol stamps.

(9) "Boiler blowoff piping" means the piping, fittings, and valves from the boiler to the blowoff tank, blowoff separator, or other safe point of discharge through which the water in the boiler may be blown out under pressure, except for drains such as those used in water columns, gauge glasses, or piping to feed water regulators and similar devices.

(10) "Boiler blowdown vessel" means an unfired pressure vessel into which water is discharged above atmospheric pressure from a boiler blowoff line.

(11) "Boiler installation" means the installation of a boiler, including all connected piping, valves, fittings, flanges, firing equipment, controls, appurtenances, and auxiliaries. The term includes the field assembly of boilers.

(12) "CSD-1" means the ASME code for controls and safety devices for automatically fired boilers.

(13) "Certificate of competency" means a certificate issued to a person who has passed an examination for inspectors prescribed by the board of boiler rules.

(14) "Chief inspector" means the chief boiler inspector appointed under the act.

(15) "Condemned boiler" means a boiler that has been inspected and declared unsafe or rejected for use by an inspector who is qualified to take such action and who has applied a stamping or marking designating its rejection.

(16) "Department" means the department of energy, labor and economic growth.

(17) "Deputy inspector" means an inspector who is licensed under the act and appointed by the director.

(18) "Existing installation" means and includes any steam boiler constructed, installed, placed in operation, or contracted for before August 10, 1917, or any hot water heating or supply boiler constructed, installed, placed in operation, or contracted for before the effective date of these rules.

(19) "External inspection" means an inspection which is conducted while the boiler is under pressure and which does not involve examination of the internal surfaces of the pressure parts of the boiler.

(20) "Field assembly" means assembling prefabricated boiler pressure parts without field welding or riveting.

(21) "Field erection" means the erecting and assembling of boiler parts by welding, riveting, or other fabrication processes.

- (22) "Flash tank" means a closed vessel equipped with internal baffles or an apparatus for the purpose of separating moisture from flash steam as it passes through the vessel.
- (23) "Hobby" means an interest or activity that a person pursues in his or her leisure time without compensation.
- (24) "Hot water heating and hot water supply boiler" means a boiler that operates at pressures of not more than 160 psi or temperatures of not more than 250 degrees Fahrenheit, at or near the boiler outlet.
- (25) "Inspector" means an individual who holds a valid certificate of competency and national board commission.
- (26) "Internal inspection" means an inspection made when a boiler is shut down and handholes or manholes are opened for inspection of the interior.
- (27) "Labeled" means devices, equipment, appliances, or material to which have been affixed a label, seal, symbol, or other identifying mark of a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of the production of the items and by whose label the manufacturer attests to compliance with applicable nationally recognized standards.
- (28) "Licensed boiler installer" means a person licensed under the act to engage in the business of making piping connections to a boiler or in the business of field-assembling boilers.
- (29) "Licensed boiler repairer" means a person licensed under the act to engage in making or supervising all phases of boiler repair, alteration, or field erection.
- (30) "Listed" means equipment, appliances, or material included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment, appliances, or materials, and whose listing states either that the equipment, appliances, or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner. The authority having jurisdiction shall utilize the system employed by the listing organization to identify a listed product.
- (31) "Mechanical assembly" means the work necessary to establish or restore a pressure retaining boundary whereby pressure retaining capability is established through a mechanical, chemical, or physical interface.
- (32) "Mechanical repair" means a method of repair which restores a pressure retaining boundary to a safe and satisfactory operating condition, where the pressure retaining boundary is established by a method other than welding or brazing.
- (33) "Miniature boiler" means a power boiler that does not have any of the following:
- (a) An inside diameter of the shell of more than 16 inches.
  - (b) A working pressure of more than 100 psig.
  - (c) A gross volume of more than 5 cubic feet.
  - (d) More than 20 square feet of heating surface.
- (34) "Miniature locomotive boiler" means a miniature hobby steam locomotive boiler which operates on a narrow gauge track that is less than 24 inches wide and which is for public display or use.
- (35) "Modular boiler" means a steam or hot-water heating assembly consisting of a grouping of individual boilers called modules, intended to be installed as a unit, with a

single inlet and a single outlet. Modules may be under 1 jacket or may be individually jacketed.

(36) "NBIC" means national board inspection code.

(37) "New boiler" means a boiler constructed, installed, placed in operation, or contracted for after July 1, 1966.

(38) "Nonstandard boiler" means a boiler that does not bear the national board stamping or the stamp of any state or political subdivision which has adopted a standard of construction equivalent to that required by the board of boiler rules.

(39) "Owner or user" means a person, firm, partnership, or corporation that owns or operates a boiler within this state.

(40) "Out-of-use boiler" means a boiler not ready for use having the fuel supply, electricity, and all piping that may pressurize the boiler disconnected.

(41) "Portable boiler" means a boiler which is primarily intended for temporary location and which is, by its construction and usage, obviously portable.

(42) "Pressure-retaining items" means any boiler, pressure vessel, piping, or material used for the containment of pressure, either internal or external. The pressure may be obtained from an external source, or by the application of heat from a direct source, or any combination thereof.

(43) "Reinstalled boiler" means a boiler which is removed from its original setting and which is reinstalled at the same location or reinstalled at a new location.

(44) "Rental boiler" means a boiler which is in temporary use for not more than 1 year and which may or may not be installed inside a boiler room, temporary room, or temporary shed or without external covering.

(45) "Repair" means the work necessary to restore a boiler or its piping to a safe and satisfactory operating condition.

(46) "Safe point of discharge" means a point of discharge that will protect personnel and property from injury due to discharge.

(47) "Special inspector" means a boiler inspector who holds a license in the state of Michigan pursuant to 1965 PA 290, MCL 408.751 et seq. and who is regularly employed by an insurance company authorized to insure against a loss from boiler accidents in this state or by any city that is exempt under the act and has an authorized boiler inspection department.

(48) "Standard boiler" means a boiler that bears the stamp of the national board of boiler and pressure vessel inspectors or of another state or political subdivision which has adopted a standard of construction equivalent to that required by the board of boiler rules of this state.

(49) "Traction boiler" means a boiler designed for the express purpose of pulling farm equipment or to convert steam power into flywheel energy driving farm apparatus such as threshers, saws, or grinding equipment.

(50) "Used boiler" means a boiler that is being reinstalled by the same owner.

(51) "Water heater" means a heater for use in commercial or industrial sizes providing corrosion resistance for supplying potable hot water at pressures not exceeding 160 psi or temperatures not exceeding 210 degrees Fahrenheit. A water heater that does not exceed any of the following is exempt from these rules:

(a) A heat input of more than 200,000 BTU per hour.

(b) A water temperature of more than 210 degrees Fahrenheit.

(c) A nominal water-containing capacity of more than 120 gallons.

History: 1999 MR 12, Eff. Jan. 4, 2000; 2000 MR 1, Eff. Jan. 27, 2000; 2002 MR 23, Eff. Jan. 1, 2003; Eff. November 6, 2006; **July 27, 2009.**

**R 408.4024 Adoption of NBIC by reference.**

Rule 24. (1) The owner shall ensure the inspection, repair, and alteration of boilers, piping, and blowdown vessels is in accordance with the NBIC, 2007 edition, except as modified by these rules. The code is adopted by reference in these rules and available for inspection at the Michigan Department of Energy, Labor & Economic Growth, Bureau of Construction Codes, 6546 Mercantile Way, Lansing, Michigan 48911 or from the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229, at a cost as of the time of adoption of these amendatory rules for a total of \$189.50.

(2) The accreditation program described in the NBIC for repairs and alterations to pressure retaining items is mandatory for repairs to all power boilers and high pressure high temperature water boilers and alterations to any boiler not exempt by these rules. Repair companies in possession of a certificate of authorization issued by the national board of boiler and pressure vessel inspectors to repair and alter pressure retaining items shall have in their employ an individual with an appropriate class repairer license issued by the boiler division of the department. Repair companies not currently in possession of the certificate of authorization or a certificate of authorization issued by ASME shall have 1 year from the date of adoption of this rule to secure the certificate. Companies currently in possession of a valid certificate issued by ASME have until the next certificate review or 1 year, whichever is greater, to secure the certificate of authorization identified above. The board may waive the time requirement if appropriate justification is presented.

(3) Where the text of the NBIC refers to the "certificate holder," the reference shall apply to all licensed boiler repairers, except when the reference is in relation to completion of NBIC forms and NBIC stamping, the reference shall refer to repair companies in possession of a valid certificate of authorization issued by the national board of boiler and pressure vessel inspectors to repair and alter pressure retaining items.

(4) The standard welding procedures referenced in the NBIC are accepted for use in this state, but are not mandatory. A licensed boiler repairer who elects to use 1 or more of the standard welding procedures shall file a list of the standard welding procedure identification numbers with the boiler division of the department before conducting any repairs or alterations requiring welding.

History: 1999 MR 12, Eff. Jan. 4, 2000; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.; Eff. July 27, 2009.**

**R 408.4025 ASME code; adoption by reference.**

Rule 25. (1) A boiler, blow down vessel, and expansion tank shall be constructed as prescribed by these rules and the ASME boiler and pressure vessel code, sections I, II, III, IV, V, VIII, IX, X, XI, 2007 edition and its 2008a addenda, and ASME code B31.1,

2007 edition, power piping, are adopted by reference in these rules and are available for inspection at the Michigan Department of, Energy, Labor & Economic Growth, Bureau of Construction Codes, 6546 Mercantile Way, Lansing, Michigan 48911 or from the ASME International, 22 Law Drive, Fairfield, New Jersey 07007, at a cost as of the time of adoption of these amendatory rules of \$12,874.99 and \$315.00 respectively.

(2) The board may accept pressure-retaining items which have been constructed to standards other than ASME standards and which have been accepted by application of the national board of boiler and pressure vessel inspectors' criteria for registration procedure.

(3) The owner shall not recalculate design maximum allowable working pressures based on ASME codes published after 1998 for boilers in-service before December 31, 1998.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 56, Eff. Nov. 14, 1968; 1954 ACS 68, Eff. June 3, 1971; 1954 ACS 73, Eff. Nov. 4, 1972; 1954 ACS 86, Eff. Jan. 16, 1976; 1954 ACS 98, Eff. Jan. 24, 1979; 1979 AC; 1985 MR 2, Eff. Mar. 7, 1985; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; 2002 MR 23, Eff. Jan. 1, 2003; Eff. November 6, 2006; **Eff. July 27, 2009.**

#### **R 408.4026 Inspection and stamping during construction.**

Rule 26. The manufacturer shall register a boiler, blowdown vessel, and expansion tank other than a cast sectional boiler built or constructed for use in this state after the effective date of these rules, with the national board of boiler and pressure vessel inspectors.

History: 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; **Eff. July 27, 2009.**

#### **R 408.4027 Adoption; ASME code CSD-1.**

Rule 27. (1) The owner shall ensure that the installation, maintenance, operation, and testing of controls and safety devices is in accordance with manufacturer's instructions and ASME code CSD-1, 2006 edition, except as modified by these rules. The code is adopted by reference in these rules and available for inspection at the Michigan Department of Energy, Labor & Economic Growth, Bureau of Construction Codes, 6546 Mercantile Way, Lansing, Michigan 48911 or from the ASME, 22 Law Drive, Fairfield, New Jersey 07007, at a cost as of the time of adoption of these amendatory rules of \$85.00.

(2) An owner or user of a boiler system shall ensure that the maintenance and testing of controls and safety devices is conducted by an individual with a valid mechanical contractor license with the appropriate classification pursuant to 1984 PA 192, MCL 338.971 et seq.

(3) An owner or user shall provide the inspector, at the time of certificate inspection, with evidence showing what tests have been completed annually. The evidence shall be a dated and signed service report or checklist, listing each control and safety device tested with the manufacturer's name, model number, set point, and actual operational test point. An example of a report or checklist may be found in CSD-1, 2006 edition,

appendix C. If an owner does not provide the inspector with the required evidence of annual testing for each year between certificate inspections, then the inspector may issue a certificate of inspection for a term less than that stated in R 408.4057.

Exception: For hot water heating boilers with a BTU input of 400,000 or less, the requirements of this rule need only be conducted once during an inspection cycle but shall be performed within 12 months prior to the certificate inspection required by R 408.4057(1)(c).

(4) The owner, user, or operator of a boiler system shall ensure that the daily, weekly, and monthly operational checks are performed and documented pursuant to the manufacturer's instructions and these rules. If the manufacturer's instructions are not available, CSD-1, 2006 edition, nonmandatory appendix D contains a recommended checklist for additional information on periodic checks.

(5) A manually operated remote shutdown switch as required by CSD-1, 2006 edition, shall be located outside of each exit access doorway to the boiler room. The switch may be located just inside each exit access doorway should a possibility of tampering or weather conditions exist. A licensee may request a deviation from the requirements of this subrule by submitting drawings clearly showing the deviation and stating justification for the request to the chief inspector for review and approval before the installation of a boiler. The chief inspector shall notify the licensee of the approval or denial of the request.

(6) A single manually-operated remote shutdown switch may be used in a multiple boiler installation that shares a common boiler room.

Exception: Kitchen cooking boilers, steam kettles, and steam cookers used for food preparation located in a kitchen shall be exempt from a manually operated remote shutdown switch.

(7) Where applicable, the boiler installation shall comply with the Michigan mechanical code, R 408.30901 to R 408.30998, Michigan plumbing code, R 408.30701 to R 408.30796 and Michigan electrical code, R 408.30801 to R 408.30880.

History: 1995 MR 4, Eff. Apr. 21, 1995, 1999 MR 12, Eff. Jan. 4, 2000; 2002 MR 23, Eff. Jan. 1, 2003; Eff. November 6, 2006; **Eff. July 27, 2009.**

#### **R 408.4028 Manufacturer's data reports; filing.**

Rule 28. A manufacturer's data report for boilers shall be signed by an authorized inspector and shall be filed by the manufacturer with the chief inspector before installation. A data report that is signed by an authorized inspector and the ASME stamp on the boiler denotes that the boiler has been constructed in accordance with these rules. If a boiler is of special design, blueprints showing details of the proposed construction shall be submitted to the chief inspector and his or her approval shall be secured before construction is started.

History: 1995 MR 4, Eff. Apr. 21, 1995; **Eff. November 6, 2006.**

**R 408.4029 Allowable pressure of noncode boilers.**

Rule 29. The maximum allowable pressure of a boiler which does not carry the American society of mechanical engineers code symbol may be computed in accordance with the requirements of R 408.4212(1).

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4031 Installation and reinstallation of boilers.**

Rule 31. (1) The owner shall ensure that the installation of a new boiler or a reinstalled boiler is in accordance with the requirements of these rules, the ASME boiler and pressure vessel code, 2007 edition, which is adopted by reference in R 408.4025 and the NBIC 2007 edition, which is adopted by reference in R 408.4024.

(2) Where applicable, the boiler installation shall comply with the Michigan mechanical code, R 408.30901 to R 408.30998, Michigan plumbing code, R 408.30701 to R 408.30796 and Michigan electrical code, R 408.30801 to R 408.30880.

Exception: (1) The ASME code requirement for the completion of a P4B data report for the installation of mechanically assembled boiler external piping is not required.

(2) The NBIC code, part 1, section 2, paragraph 2.4.4, is enforced by the Michigan plumbing code, R 408.408.30701 to R 408.30796.

(3) Witnessing of the pressure test required by the NBIC part 1, section 2, paragraph 2.10.2, is not required.

(4) The NBIC code, part 1, section 3, paragraph 3.6.1, is enforced by the Michigan mechanical code, R 408.30901 to R 408.30998.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 56, Eff. Nov. 14, 1968; 1954 ACS 73, Eff. Nov. 4, 1972; 1954 ACS 86, Eff. Jan. 16, 1976; 1954 ACS 98, Eff. Jan. 24, 1979; 1979 AC; 1985 MR 2, Eff. Mar. 7, 1985; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; 2001 MR 4, Eff. Mar. 1, 2001; 2002 MR 23, Eff. Jan. 1, 2003; Eff. November 6, 2006; **Eff. July 27, 2009**.

**R 408.4032 Non-boiler external piping; power boilers; adoption of standards by reference.**

Rule 32. (1) The owner shall ensure that the installation of piping not covered by the ASME boiler and pressure vessel code, section I, 2007 edition, and its 2008a addenda is installed as prescribed by the ASME code for pressure piping, B31.1, 2007 edition, adopted by reference in R 408.4025.

(2) The owner of a chemical plant or petroleum refinery shall comply with subrule (1) of this rule or shall ensure the installation is installed as prescribed by the ASME code for chemical plants and petroleum refineries, B31.3, 2007 edition.

(3) A licensee under this rule is not required to possess an ASME code symbol stamp, but shall hold a valid installer's license.

(4) The owner shall ensure that the installation of all of the following piping is in accordance with subrule (1) of this rule:

(a) Blowoff piping beyond the second valve out to the safe point of discharge.

(b) Steam piping out to the load.

(c) Feed-water piping from the pump.

(d) Condensate piping.

History: 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; 2002 MR 23, Eff. Jan. 1, 2003; Eff. November 6, 2006; **Eff. July 27, 2009.**

**R 408.4033 Permits; documentation for installation, reinstallation, alteration, and repair of boilers, boiler external piping, and non-boiler external piping.**

Rule 33. (1) All of the following provisions apply to installation permits:

(a) A person shall not install, or reinstall, a boiler without holding a proper license and first securing a permit from the boiler division of the department. The licensee applying for the permit shall ensure that work does not proceed until an approved permit has been secured.

(b) A person shall not install or replace welded pipe without holding a proper license and first securing a permit from the boiler division of the department. The licensee applying for the permit shall ensure that work does not proceed until an approved permit has been secured.

(c) A person shall not install nonwelded pipe without holding a proper license. A permit is not required.

(2) All of the following provisions apply to repair and alteration permits or reports:

(a) A person shall not alter or repair a boiler without holding a proper license and first securing a permit from the boiler division of the department. The licensee applying for the permit shall ensure that work does not proceed until an approved permit has been secured, except as provided by section 18 of the act.

(b) A person shall not repair or replace welded piping without holding a proper license and first securing a permit from the boiler division of the department. The licensee applying for the permit shall ensure that work does not proceed until an approved permit has been secured, except as provided for in section 18 of the act.

(c) A person shall not replace nonwelded piping without holding a proper license. A permit is not required.

(d) A person shall not perform welded repairs to nonwelded piping without holding a proper license and first securing a permit from the boiler division of the department. The licensee applying for the permit shall ensure that work does not proceed until an approved permit has been secured, except as provided for in section 18 of the act.

(e) A licensee who makes welded repairs to boilers or boiler external piping requiring the use of the national board "R" symbol stamp shall furnish the boiler division of the department, with 1 copy of the approved permit application, along with reports as required by the NBIC, upon completion of the work.

(f) A public utility or industrial plant that has been granted exemption under section 23 of the act that makes a welded repair to a boiler or boiler external piping, as defined in section I of the ASME code, shall furnish the boiler division of the department with a completed repair report on forms prescribed by the boiler division.

(g) A public utility or industrial plant that has been granted an exemption under section 23 of the act that makes a welded repair to non-boiler external piping shall maintain records of the repairs and make the records available for review as required by the board of boiler rules.

(3) A permit is required for a change in use of an existing boiler or replacement by mechanical methods, without welding, of sections in sectional boilers; heat exchangers; feed water heater or economizer; and tube bundles. A licensee replacing boiler components required by these rules to be code symbol stamped and national board registered shall provide the boiler division with the manufacturer's data reports.

(4) Any changes in the scope of work stated on the original permit application shall be submitted to the inspector for review and approval and reported to the boiler division.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1979 ACS 8, Eff. Dec. 9, 1981; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; 2002 MR 23, Eff. Jan. 1, 2003; Eff. November 6, 2006; **Eff. July 27, 2009.**

**R 408.4035 Permits; issuance to licensed persons only.**

Rule 35. Permits shall be issued only to persons licensed as required by the act and these rules. Work shall be performed by or under the supervision of a licensed person.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995.**

**R 408.4036 Multiple contractors.**

Rule 36. Each contractor performing separate work on the same boiler installation shall possess a valid boiler installer's license and shall obtain a permit to install for that part of the installation he is to perform.

History: 1954 ACS 56, **Eff. Nov. 14, 1968;** 1979 AC.

**R 408.4038 Fees.**

Rule 38. (1) Fees for licenses, boiler operator and stationary engineer registration; permits, certificates, and inspections are as follows:

Licenses	
Installer license .....	\$80.00.
Installer exam.....	\$100.00.
Installer renewal .....	\$80.00.
Repairer license .....	\$80.00.
Repairer exam.....	\$100.00.
Repairer renewal.....	\$80.00.
Inspector license .....	\$80.00.
Inspector exam.....	\$100.00.
Inspector renewal.....	\$50.00.
Boiler operator registration .....	\$80.00.
Boiler operator examination .....	\$100.00.
Boiler operator registration renewal .....	\$80.00.
Stationary engineer registration .....	\$80.00.
Stationary engineer written examination .....	\$100.00.
Stationary engineer registration renewal.....	\$80.00.
3 <sup>rd</sup> class stationary engineer oral examination .....	\$150.00.

2 <sup>nd</sup> class stationary engineer oral examination.....	\$200.00.
1 <sup>st</sup> class stationary engineer oral examination.....	\$250.00.

Examination fees are nonrefundable.

#### Permit applications

Nuclear installation permit application .....	\$1,380.00.
Nuclear repair permit application.....	\$400.00.
Low-pressure installation permit application.....	\$75.00.
High pressure installation permit application .....	\$120.00 +.05 per foot of piping.
Repair permit application.....	\$75.00.

Permit application fees are nonrefundable.

#### Certificates

Certificates .....	\$60.00.
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#### Inspections

Power boilers-150 square feet or less .....	\$70.00.
Power boilers-more than 150 square feet to 4,000 square feet.....	\$165.00.
Power boilers-more than 4,000 square feet to 10,000 square feet.....	\$180.00.
Power boilers-more than 10,000 square feet .....	\$205.00.
Low-pressure heating boiler without manhole .....	\$70.00.
Inspection of an additional low-pressure heating boiler without a manhole at the same physical location, on the same date .....	\$60.00.
Low-pressure heating boiler with manhole .....	\$85.00.
Low-pressure hot water supply boiler.....	\$60.00.
Inspection of an additional low-pressure hot water supply boiler at the same physical location, on the same date.....	\$45.00.
Low-pressure process boiler without manhole .....	\$70.00.
Low-pressure process boiler with manhole .....	\$85.00.
Miniature hobby locomotive boiler .....	\$15.00.

#### Special inspections

(2) The boiler division shall provide special inspections not otherwise covered in the fee schedule. The charge for this service shall be at the rate of \$100.00 for the first hour and \$100.00 for each additional hour, plus lodging, meals, transportation, and other related expenses incurred for performing special inspections.

(3) Fees required under these rules shall be paid by cash, money order, or check to the department. Money orders or checks shall be made payable to: "State of Michigan."

History: 1979 ACS 8, Eff. Dec. 9, 1981; 1991 MR 1, Eff. Jan. 28, 1991; 1999 MR 12, Eff. Jan. 4, 2000; 2000 MR 1, Eff. Jan. 27, 2000; 2001 MR 4, Eff. Mar. 1, 2001; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. July 27, 2009.**

**R 408.4039 Permits to alter boiler, piping, or vessel.**

Rule 39. (1) The boiler division of the department may issue a permit to alter a boiler, piping, or vessel subject to these rules only to a Michigan-licensed boiler repairer who possesses a valid certificate of authorization from the national board of boiler and pressure vessel inspectors for alterations or the ASME boiler and pressure vessel committee to build the type of boiler, piping, or vessel being altered. Drawings and calculations covering all details of the proposed alteration shall accompany the application for a permit to alter.

(2) The licensed repairer shall perform the alteration in accordance with the NBIC.

(3) The licensed repairer who makes the alteration shall prepare a report on forms prescribed by the boiler division of the department. The licensed repairer shall furnish an original and 2 copies of the report to the boiler division of the department, and upon request, 1 copy of the report to the boiler owner and user. The report shall clearly indicate what changes have been made to the original construction. The report shall show, in the spaces provided, the manufacturer's serial number of the boiler, the national board number, if assigned, and the Michigan serial number assigned.

(4) The licensed repairer who makes the alteration shall prepare and attach a nameplate that complies with the requirements of the NBIC.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 73, Eff. Nov. 4, 1972; 1979 AC; 1979 ACS 8, Eff. Dec. 9, 1981; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; **Eff. November 6, 2006.**

**R 408.4045 Registration of boilers.**

Rule 45. (1) Within 6 months from the effective date of these rules, all owners or users of boilers and their installations now in use or installed ready for use in the state shall report to the chief inspector on forms prescribed by the department, giving the location, type, capacity, age, and date of installation.

(2) Before transfer of ownership of a boiler is complete, the current owner shall assure all invoices for inspection certificates and inspections for services rendered under his or her ownership are paid in full. Upon completion of transfer of ownership, the new owner of a boiler shall notify the boiler division of the department of change in ownership of a boiler or change in ownership of a location where a boiler is installed. Upon written notification, a new certificate of inspection shall be issued in the name of the new owner.

(3) A boiler owner or user shall notify the boiler division of the department immediately when his or her boiler insurance has been discontinued.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; **Eff. November 6, 2006.**

**R 408.4047 Exempt boilers.**

Rule 47. These rules do not apply to any of the following:

(a) A boiler under federal control.

(b) A swimming pool heater, open car wash heater, and similar types of equipment which do not have intervening valves on the return or discharge piping, which do not

have a reduction in pipe size in the return or discharge piping, and which do not generate more than normal circulating pump pressure.

(c) A miniature steam or marine engine used for a hobby.

(d) A boiler used in the power plant of a self-propelled vehicle designed primarily for transportation of persons or property on a highway, except for a vehicle used exclusively on stationary rails or tracks.

(e) A boiler used on a mint farm for mint processing purposes.

(f) A nonvaporizing, organic fluid boiler if the boiler meets all of the following criteria:

(i) The system is vented and does not have valves or restrictions in the pipe between the boiler and the vent.

(ii) The vent pipe is sized so that the thermal expansion of the fluid will not result in an increase in pressure on the system, which is verifiable with engineering data.

(iii) The owner or user provides the boiler division of the department with calculations performed by an engineer, which verify that pressure due to thermal expansion cannot exist in the boiler as installed.

(g) A low-pressure steam boiler that has a volume of less than 5 cubic feet and that does not have piped feed connections.

(h) A water tube or coil type hot water heating boiler requiring forced circulation not exceeding any 1 of the following:

(i) Maximum water temperature of 200 degrees Fahrenheit.

(ii) Relief valve set pressure of 30 psi.

(iii) Heat input of 200,000 BTU/hr.

Exception. Modular or multiple boiler installations exceeding 1,000,000 BTU/hr input are not exempt.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 61, Eff. Feb. 16, 1970; 1954 ACS 68, Eff. June 3, 1971; 1954 ACS 86, Eff. Jan. 16, 1976; 1979 AC; 1999 MR 12, Eff. Jan. 4, 2000; Eff. November 6, 2006; **Eff. July 27, 2009.**

#### **R 408.4049 Boilers subject to inspection.**

Rule 49. Each boiler used or proposed to be used within this state shall be thoroughly inspected as to its construction, installation, and condition.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 68, Eff. June 3, 1971; 1979 AC; 1979 ACS 8, **Eff. Dec. 9, 1981.**

#### **R 408.4051 Inspection of certain boilers required.**

Rule 51. Upon completion of the installation, all boilers shall be inspected by the chief inspector or a deputy inspector.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1979 ACS 8, **Eff. Dec. 9, 1981.**

#### **R 408.4055 Right of access.**

Rule 55. The director, chief inspector, or any deputy inspector shall have free access, during reasonable hours, to any premises in the state where a boiler is being

constructed, installed, repaired, operated, or connected and ready for use for the purpose of ascertaining whether the boiler is in accordance with the act.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1999 MR 12, **Eff. Jan. 4, 2000.**

#### **R 408.4057 Boiler inspection.**

Rule 57. (1) Once a boiler has been inspected by the chief or deputy inspector and the boiler and its installation approved, all certificate inspections shall be conducted in accordance with the NBIC and these rules by an inspector who is properly licensed to inspect boilers in this state in accordance with the following provisions:

(a) A power boiler, process boiler, or high-pressure, high-temperature water boiler shall receive a certificate inspection annually and shall also be externally inspected annually, while under pressure, within 6 months from the date of the internal inspection.

(b) A low-pressure steam or vapor heating boiler shall receive a certificate inspection biennially.

(c) Hot water heating and hot water supply boilers shall receive a certificate inspection triennially, with an internal inspection at the discretion of the inspector.

(d) A nonvaporizing, organic fluid boiler that is not exempt under these rules shall receive an external certificate inspection triennially.

(e) A miniature hobby locomotive boiler shall receive a certificate inspection annually.

(f) A grace period of 2 months beyond the periods specified in subdivisions (a) to (e) of this subrule may lapse between certificate inspections, and the board may permit longer periods between certificate inspections.

(g) Internal inspection of cast boilers shall be at the discretion of the inspector.

(2) The certificate inspection shall be an internal inspection if construction allows, otherwise the certificate inspection shall be as complete an inspection as possible unless specified otherwise under this rule.

(3) The chief inspector, deputy inspector, or a special inspector provided for in the act shall make the inspections specified in this rule.

(4) If, at the discretion of the inspector, a hydrostatic test is necessary, the boiler owner or user shall ensure that the test is performed in the presence of the inspector.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 56, Eff. Nov. 14, 1968; 1954 ACS 98, Eff. Jan. 24, 1979; 1979 AC; 1979 ACS 8, Eff. Dec. 9, 1981; 1985 MR 2, Eff. Mar. 7, 1985; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; 2000 MR 1, Eff. Jan. 27, 2000; 2002 MR 23, Eff. Jan. 1, 2003; Eff. November 6, 2006; **Eff. July 27, 2009.**

#### **R 408.4058 Extension of internal inspection certificate to 24 months.**

Rule 58. (1) An internal boiler inspection may be increased from an annual inspection to a 24-month inspection frequency by approval of the board of boiler rules. An employee delegated by the utility or industrial facility shall apply for the extension. The following information shall be addressed by plant orders, procedures, or policies:

(a) Operator training.

(b) Boiler maintenance.

(c) Water chemistry.

- (d) Operating parameters.
  - (e) Chemical cleaning schedule.
  - (f) Protective devices.
  - (g) Boiler external inspection.
  - (h) Testing of pressure relief valves in accordance with the NBIC. Repairs shall be conducted by the valve manufacturer or a "VR" stamp holder.
- The information may be contained in 1 document or several if 1 document contains references to all other documents addressing the required information.
- (2) The plant owner shall establish a review committee. The inspector shall be a member of the committee. The purpose of the committee is to determine the acceptability of a boiler to operate safely for a 24-month period. The committee shall have access to and review all information pertaining to the past operation, maintenance, and repair of the boiler. The review committee meeting shall be conducted within 30 days after the internal inspection. The committee may decrease the period of time the boiler may operate, but shall not extend the period beyond 24 months. The signed summary report of the review committee meeting shall be submitted to the boiler division of the department. The grace period provided under R 408.4057 does not apply to this rule. The inspector shall indicate the next inspection due date on his or her inspection report to the boiler division of the department.
- (3) Utilities or industrial facilities with a prescheduled boiler internal certificate inspection period shall communicate with the boiler division the date when the boiler is removed from service. The boiler internal inspection may occur at any time during the outage period. The next 24-month operating period shall be calculated based on the date of the certificate inspection conducted during this period.
- (4) An external inspection of the boiler shall be conducted while under pressure, within 12 months of the certificate inspection.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 2002 MR 23, Eff. Jan. 1, 2003; Eff. November 6, 2006; **Eff. July 27, 2009.**

**R 408.4059 Notification for inspection.**

Rule 59. The owner or user shall prepare each boiler for internal inspection in accordance with the NBIC and these rules and shall prepare for and apply a hydrostatic pressure test, whenever necessary, on the date specified by the chief inspector, deputy inspector, or special inspector.

History: 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.**

**R 408.4065 Examinations for inspector licenses; place and time.**

Rule 65. Examinations for boiler inspector licenses and certificates of competency shall be held at a location selected by the boiler division of the department, 4 times each year, on the first Wednesday and Thursday in March, June, September, and December.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; **Eff. November 6, 2006.**

**R 408.4067 Qualifications of applicants for a boiler inspector license.**

Rule 67. An applicant for examination for a boiler inspector license shall have had not less than 3 years' practical experience in the design, construction, or operation of high pressure boilers, as mechanical engineer, steam engineer, or boilermaker or shall have had not less than 3 years' inspection experience as an inspector of high pressure boilers. A credit of 2 years of the required experience shall be given to applicants holding an engineering degree from an accredited college of engineering.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 98, **Eff. Jan. 24, 1979**; 1979 AC.

**R 408.4069 Examination; contents of applications.**

Rule 69. Application for an examination for a certificate of competency shall be in writing upon a form to be furnished by the director stating the school education of the applicant, a list of his employers, his period of employment and position held with each employer. An application containing a willful falsification or untruthful statement shall be rejected.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4071 Examination; contents.**

Rule 71. If an examination applicant's history and experience meet the requirements of R 408.4067, the applicant shall be given a written examination dealing with the design, construction, installation, and repair of boilers and their appurtenances. The applicant shall be accepted or rejected on the merits of the examination. If the applicant is successful in meeting the requirements of the board, a license and certificate of competency will be issued by the director. An applicant who fails to pass the examination may appeal to the board for another examination, which shall be given by the board within 90 days. The record of the applicant's examination shall be accessible to the applicant and his or her employer.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995**.

**R 408.4073 Examination fee for boiler inspector's license.**

Rule 73. A fee prescribed by R 408.4038 shall be charged for each applicant taking the examination for boiler inspector's license and shall accompany the application filed with the department. The fee entitles the applicant to take the examination twice if necessary. An additional fee prescribed by R 408.4038 shall accompany each subsequent application.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1979 ACS 8, Eff. Dec. 9, 1981; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006**.

**R 408.4075 Special inspector's license.**

Rule 75. The director, upon the request of a company authorized to insure against loss from accident of boilers in this state or a city that has an authorized boiler inspection department, shall issue, to an inspector of the company or the city, a license as a

special inspector if the inspector, before receiving his or her license, satisfactorily passes the examination provided for in R 408.4071 or, in place of the examination, holds a license or a certificate of competency as an inspector of boilers for a state that has a standard of examination substantially equal to that of this state or holds a commission as an inspector of boilers issued by the national board of boiler and pressure vessel inspectors. Each inspector shall present himself or herself for a review of Michigan boiler law and rules conducted by the chief inspector before a license is issued.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995.**

**R 408.4079 Annual renewal of license.**

Rule 79. Each license issued to a special inspector shall be renewed at the beginning of each calendar year following the date of issuance, and shall be accompanied by a fee as prescribed by R 408.4038.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1979 ACS 8, **Eff. Dec. 9, 1981.**

**R 408.4081 Special inspector employed by insurance company.**

Rule 81. A special inspector's license issued to an inspector in the employ of an insurance company shall be held at the office of the employing company. The license and the identification card shall be returned to the chief inspector when the special inspector to whom the license and identification card were issued is no longer in the company's employ or at the request of the chief inspector, as specified by section 14 of the act.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995.**

**R 408.4087 Reporting unregistered boilers.**

Rule 87. (1) If a special inspector visits a location to conduct an inspection as required by these rules, then he or she shall report the location of all boilers that are not registered. The report shall be in addition to the report pertaining to the inspection of registered boilers and their installation. The chief inspector shall assign a deputy inspector to visit the location to inspect all unregistered boilers and affix a Michigan serial number.

(2) If an inspector makes an inspection of a boiler that does not bear a Michigan serial number, then the inspector shall attempt to verify whether the boiler is unregistered or is missing the serial number tag. If the inspector is unable to determine that the boiler is registered, then he or she shall report it as prescribed in subrule (1) of this rule.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. July 27, 2009.**

**R 408.4089 Boiler installers' licenses.**

Rule 89. Boiler installers shall be licensed as required by section 13 of the act.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4091 Application for boiler installer's license.**

Rule 91. (1) An application for a boiler installer's license shall be on a form provided by the boiler division of the department. The applicant shall state the name of the business, firm, partnership, or corporation that the applicant intends to represent in the business of installing boilers and shall provide evidence of his or her past experience in the installation of boilers and evidence of his or her workmanship and engineering skills that would qualify the applicant for examination and licensing.

(2) An applicant for a boiler installer's license shall have not less than 5 years of experience in all phases of boiler installation in the class of license for which the applicant is applying. A credit of 2 years of experience towards the 5 years of experience may be given for 2 years of experience in the design, construction, manufacture, or inspection of boilers.

(3) The boiler division of the department may verify installations required to be reported on the application to establish the applicant's minimum practical installation experience in the applicant's desired license classification.

History: 1954 ACS 49, Eff. May 15, 1968; 1954 ACS 56, Eff. Nov. 14, 1968; 1954 ACS 98, Eff. Jan. 24, 1979; 1979 AC; 1979 ACS 8, Eff. Dec. 9, 1981; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006**

**R 408.4096 Filing of welding procedures.**

Rule 96. (1) If welding is employed in the installation or reinstallation of a boiler or piping, then the licensed installer shall file welding procedure specifications and the procedure qualification reports qualified in accordance with the requirements of ASME code section IX, welding and brazing qualifications, with the boiler division of the department, before conducting any installation requiring welding.

(2) A licensed installer who utilizes welding in the installation or reinstallation of boilers or piping shall have available, for the inspector's review, welding procedure specifications and welder performance qualification records to be used or that were used in the installation or reinstallation.

History: 1999 MR 12, Eff. Jan. 4, 2000; **Eff. November 6, 2006**.

**R 408.4099 Identification of applicant's business affiliation for installer's license.**

Rule 99. (1) An applicant for a boiler installer's license shall state the name of the business, firm, partnership, or corporation under which he or she intends to carry on the business of installing boilers before a license will be issued. The applicant may be the owner, a partner, an officer of a corporation, or a supervisory employee of the business, firm, partnership, or corporation legally registered with the state.

(2) A person shall not engage in installing boilers under the name of more than 1 business at any one time.

(3) When required by the ASME code, a licensee shall be in the employ of an organization in possession of the appropriate certificate of authorization.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4101 Installer's license not required.**

Rule 101. An individual employed by, and working under the supervision of, a licensed boiler installer is not required to be licensed.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4103 Examination for boiler installer's license.**

Rule 103. (1) An applicant for a boiler installer's license shall be required to take an examination approved by the board of boiler rules. The examination will be held quarterly at a location determined by the boiler division of the department. A score of 70% is required to pass the examination. A passing score on the examination is valid for 3 years. If a license is not applied for in that time, then an applicant shall file a new application for examination.

(2) A licensee wishing to upgrade his or her license to a higher classification shall maintain his or her current license in good standing for a minimum of 1 year and take the examination prescribed in subrule (1) of this rule. A licensee may only upgrade a license 1 classification at a time.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.**

**R 408.4105 Fee for boiler installer's license.**

Rule 105. The fee prescribed by R 408.4038 shall accompany the application for a boiler installer's license.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 56, Eff. Nov. 14, 1968; 1979 AC; 1979 ACS 8, **Eff. Dec. 9, 1981.**

**R 408.4107 Annual renewal of boiler installer's license; change of business affiliation.**

Rule 107. (1) A boiler installer's license shall be renewed annually upon payment of a fee as prescribed by R 408.4038.

(2) An installer's license shall expire on December 31 of each year and shall be renewed. An application for renewal shall be submitted to the boiler division of the department between September 30 and December 31. A license that is not renewed by January 1 shall be voided and may be reinstated only upon application for reinstatement and payment of both the renewal fee and a reinstatement fee of \$80.00. A person requesting renewal of a license within 3 years after the license is voided pursuant to this subrule is not subject to reexamination for the license, but shall pay both the reinstatement fee and the annual license renewal fee for the current renewal year. A

person who fails to renew a license for 3 consecutive years shall meet the requirements of, and take an examination for, the class of license sought.

(3) A licensee who changes business affiliation shall notify the chief inspector, on a form provided by the boiler division of the department, of the name and address of the new business affiliate under which the licensee intends to use his or her license. A fee of \$25.00 shall accompany the notification form.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1979 ACS 8, Eff. Dec. 9, 1981; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.**

#### **R 408.4109 Classes of boiler installer's licenses.**

Rule 109. (1) A class 1B installer's license qualifies a person to install a low-pressure boiler that does not exceed a firing rate of 1,000,000 BTU per hour as certified by the boiler manufacturer. For a class 1B license, the sum of all modules in a modular boiler shall not exceed a firing rate of 1,000,000 BTU per hour as certified by the boiler manufacturer.

(2) A class 2B installer's license qualifies a person to do all of the following:

(a) Install a low-pressure boiler of any capacity or firing rate.

(b) To perform work covered by a class 1B license.

(3) A class 3B installer's license qualifies a person to do all of the following:

(a) Install a power boiler that has a capacity of not more than 5,000 pounds of steam per hour.

(b) Install or replace non-boiler external piping as defined by ASME code B31.1 and R 408.4032.

(c) Perform work covered by a class 2B license.

(4) A class 4B installer's license qualifies a person to do all of the following:

(a) Install a boiler that has a capacity of not more than 300,000 pounds of steam per hour.

(b) Install or replace non-boiler external piping as defined by ASME code B31.1 and R 408.4032.

(c) Perform work covered by a class 3B license.

(5) A class 5B installer's license qualifies a person to do all of the following:

(a) Install a boiler of any capacity or firing rate. Exception: a nuclear heat source boiler.

(b) Install or replace non-boiler external piping as defined by ASME code B31.1 and R 408.4032.

(c) Perform work covered by a class 4B license.

(6) A class 6B installer's license qualifies a person to install a boiler that utilizes a nuclear heat source or its parts, appurtenances, or system components. Before a license is issued, an applicant for a class 6B license shall submit evidence of both of the following:

(a) Familiarity with and knowledge of all federal rules and regulations regarding the installation of a boiler that has a nuclear heat source.

(b) Employment by a company in possession of a valid ASME nuclear code symbol applicable to the portions of any nuclear boiler system that the company proposes to install.

(7) A class P license qualifies a person to install or replace non-boiler external piping or repair non-boiler external piping as defined by ASME code B31.1 and R 408.4032.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 68, Eff. June 3, 1971; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. July 27, 2009.**

**R 408.4111 Boiler installer's installation responsibility.**

Rule 111. All boiler installations shall be made in accordance with the American society of mechanical engineers boiler code, and in accordance with these rules. Any deviation from these requirements is cause for suspension or revocation of the boiler installer's license.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4114 Inspection of components and systems in a nuclear power plant.**

Rule 114. (1) Preservice (baseline) inspection, in-service inspection, repair, replacement, modification, alteration, examination, testing, records, and reports of individual nuclear components, parts, appurtenances, piping, supports, nuclear systems, applicable associated auxiliary systems, and complete nuclear power plants that are in compliance with all of the requirements of the construction code, at the point in time the requirements have been completed, irrespective of the physical location, shall be as prescribed in section XI, rules for in-service inspection of nuclear power plant components, of the ASME boiler and pressure vessel code. A copy of the current edition of section XI is available for inspection at the Michigan Department of Energy, Labor & Economic Growth, Bureau of Construction Codes, 6546 Mercantile Way, Lansing, Michigan 48911 or from the ASME International, 22 Law Drive, Fairfield, New Jersey 07007, at a cost as of the time of adoption of these amendatory rules of \$610.00. (2) The owner of a nuclear power plant shall file inspection plans and schedules, pump and valve testing programs, and requests for relief from section XI of the ASME code requirements with the boiler division of the department. (3) The nuclear power plant shall maintain compliance with requirements, as prescribed by the nuclear regulatory commission.

History: 1954 ACS 68, Eff. June 3, 1971; 1954 ACS 86, Eff. Jan. 16, 1976; 1954 ACS 98, Eff. Jan. 24, 1979; 1979 AC; 1985 MR 2, Eff. Mar. 7, 1985; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; Eff. November 6, 2006; **Eff. July 27, 2009.**

**R 408.4117 Boiler repairers; licenses.**

Rule 117. Boiler repairers shall be licensed as required by section 13 of the act.

History: 1954 ACS 49, **Eff. Feb. 14, 1967;** 1979 AC.

**R 408.4119 Application for boiler repairer's licenses.**

Rule 119. (1) An application for a boiler repairer's license shall be on a form provided by the boiler division of the department. The applicant shall state the name of the

business, firm, partnership, or corporation that the applicant intends to represent in the business of repairing boilers and shall give evidence of his or her past experience in the repair of boilers and evidence of his or her workmanship and engineering skills that would qualify the applicant for examination and licensing.

(2) An applicant for a boiler repairer's license shall have at least 5 years of experience in all phases of boiler repair in the class of license for which the applicant is applying. A credit of 3 years of experience towards the 5 years of experience will be given for 3 years of experience in the design, construction, manufacture, or inspection of boilers.

(3) The boiler division of the department may verify repairs required to be reported on the application to establish the applicant's minimum practical repair experience in the applicant's desired license classification. Copies of the boiler division inspection reports of the repairs shall be made part of the application.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 61, Eff. Feb. 16, 1970; 1979 AC; 1979 ACS 8, Eff. Dec. 9, 1981; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.**

#### **R 408.4120 Filing of welding procedures.**

Rule 120. (1) If welding is employed in the repair, replacement, or alteration of a boiler or piping, then the licensed repairer shall file welding procedure specifications and procedure qualification reports qualified in accordance with ASME code section IX, welding and brazing qualifications, with the boiler division of the department, before conducting any welding.

(2) A licensed repairer who utilizes welding in the repair, replacement, or alteration of boilers or piping shall have available, for the inspector's review, welding procedure specifications and welder performance qualification records at the work site or other mutually agreed upon location.

History: **Eff. November 6, 2006.**

#### **R 408.4121 Examination for boiler repairer's license; establishment; administration; nuclear repairer license applicant; certificate of authorization; examination.**

Rule 121. (1) The examination shall be held quarterly at a location determined by the boiler division of the department.

(2) An applicant wishing to upgrade his or her license to a higher classification shall take the examination prescribed in subrule (1) of this rule.

(3) The director, upon the request of a company in possession of a valid ASME "N" type certificate of authorization or the national board of boiler and pressure vessel inspectors "NR" certificate of authorization, shall issue, to an individual of the company, a license as a nuclear repairer if the individual, before receiving his or her license, satisfactorily passes the examination prescribed in subrule (1) of this rule.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 61, Eff. Feb. 16, 1970; 1979 AC; 1985 MR 2, Eff. Mar. 7, 1985; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. July 27, 2009.**

**R 408.4122 Identification of applicant's business affiliation for repairer's license.**

Rule 122. (1) An applicant for a boiler repairer's license shall state the name of the business, firm, partnership, or corporation under which he or she intends to carry on the business of repairing boilers before a license will be issued. The applicant may be the owner, a partner, an officer of a corporation, or a supervisory employee of the business, firm, partnership, or corporation legally registered with the state.

(2) A person shall not engage in repairing boilers under the name of more than 1 business at any one time.

History: 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4123 Boiler repairer's license application fee.**

Rule 123. The fee prescribed by R 408.4038 shall accompany each application for boiler repairer's license.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1979 ACS 8, **Eff. Dec. 9, 1981.**

**R 408.4124 Repairer's license not required.**

Rule 124. An individual employed by, and working under the supervision of, a licensed boiler repairer is not required to be licensed.

History: 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4125 Annual renewal of boiler repairer's license; change of business affiliation.**

Rule 125. (1) A boiler repairer's license shall be renewed annually upon payment of a fee as prescribed by R 408.4038.

(2) A repairer's license shall expire on December 31 of each year and shall be renewed. An application for renewal shall be submitted to the boiler division of the department between September 30 and December 31. A license that is not renewed by January 1 shall be voided and may be reinstated only upon application for reinstatement and payment of both the renewal fee and a reinstatement fee of \$80.00. A person requesting renewal of a license within 3 years after the license is voided pursuant to this subrule is not subject to reexamination for the license, but shall pay both the reinstatement fee and the annual license renewal fee for the current renewal year. A person who fails to renew a license for 3 consecutive years shall meet the requirements of, and take an examination for, the class of license sought.

(3) A licensee who changes business affiliation shall notify the chief inspector, on a form provided by the boiler division of the department, of the name and address of the new business affiliate under which the licensee intends to use his or her license. A fee of \$25.00 shall accompany the notification form.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1979 ACS 8, Eff. Dec. 9, 1981; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.**

**R 408.4127 Boiler repairers; classes of licenses.**

Rule 127. (1) A class I license allows a licensee to repair a boiler by means other than welding, riveting, or other fabrication process.

(2) A class II license allows a licensee to do both of the following:

(a) Repair a low-pressure boiler, a hot water supply boiler, and a fire tube boiler of any pressure.

(b) Perform work covered by a class I license.

(3) A class III license allows a licensee to do all of the following:

(a) Repair a high-pressure boiler.

(b) Repair or replace non-boiler external piping, as defined by ASME code B31.1 and R 408.4032.

(c) Perform work covered by a class II license.

(4) A class IV license allows a licensee to do all of the following:

(a) Repair or field-erect a boiler of any pressure. Exception: a boiler that has a nuclear heat source.

(b) Repair or replace non-boiler external piping as defined by ASME code B31.1 and R 408.4032.

(5) A class V license allows a licensee to erect and repair a boiler that has a nuclear heat source or its parts, appurtenances, or system components, and also provides the following:

(a) The licensee may repair or replace non-boiler external piping, as defined by ASME code B31.1 and R 408.4032.

(b) Before a license is issued, an applicant for a class V license shall submit evidence of the following:

(i) Familiarity with and knowledge of all federal rules and regulations regarding the construction of a boiler that has a nuclear heat source.

(ii) Employment by a company in possession of a valid ASME N-type symbol stamp applicable to the portions of any nuclear boiler system he or she proposes to repair.

(6) A class P license qualifies a person to install or repair non-boiler external piping as defined by ASME code B31.1 and R 408.4032.

(7) A licensed boiler repairer shall secure a permit for a change in use of an existing boiler or replacement by mechanical methods, without welding, of sections in sectional boilers, heat exchangers, feed water heater or economizer, and tube bundles in accordance with R 408.4033.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 61, Eff. Feb. 16, 1970; 1954 ACS 73, Eff. Nov. 4, 1972; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; Eff. November 6, 2006; **Eff. July 27, 2009.**

**R 408.4129 Boiler repairer's repair responsibility.**

Rule 129. It is the responsibility of a licensed boiler repairer to make all boiler repairs in accordance with these rules and arrange for the required inspections with an inspector before work is started. Any deviation from these requirements is cause for suspension or revocation of the boiler repairer's license.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4131. Examination of persons with revoked licenses.**

Rule 131. The board shall require examination or reexamination of any licensee whose license has been revoked for cause.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4133 Reports of inspection to be filed.**

Rule 133. (1) Each company employing licensed boiler inspectors, within 30 days following each boiler certificate inspection made by the inspectors, shall file a report of the inspection with the chief inspector upon appropriate forms provided by the boiler division. Reports of external inspections shall not be required except when such inspections disclose that the boiler is in dangerous condition. Manufacturers or national board numbers shall be reported on all reports of inspection.

(2) The inspector shall leave a signed and dated inspection sticker or inspection report at the inspection location.

(3) The inspector shall record his or her national board of boiler and pressure vessel commission number on the inspection report.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4139 Rental boilers.**

Rule 139. A rental boiler shall be inspected before it is rented and the boiler shall be approved for temporary installation. An inspection certificate for an approved rental boiler is valid for 12 months. A licensed boiler installer shall secure an installation permit in accordance with R 408.4033 each time a rental boiler is reinstalled. The permit application for an installed rental boiler shall be posted at the rental boiler.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; **Eff. November 6, 2006.**

**R 408.4143 Refusal of inspection or nonpayment of fee.**

Rule 143. If the owner or user of a boiler required to be inspected refuses to allow an inspection to be made or refuses to pay the fee prescribed by R 408.4038, the certificate of inspection shall be suspended by the chief inspector until the owner or user allows the inspection or pays the fee.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1979 ACS 8, **Eff. Dec. 9, 1981.**

**R 408.4149 Notice of violation.**

Rule 149. A written notice of violation containing the corrections necessary shall be sent to, or served upon, the owner or user by the chief inspector, deputy inspector, or special inspector advising of the existing conditions and stating a time limit within which the correction ordered must be completed. The notice shall serve as a notice of

suspension of the certificate of inspection upon a failure to comply with a correction order by the compliance date. When the notice of violation is issued as a notice of suspension of a certificate of inspection or as a rejection or condemnation of the boiler, a copy of the notice shall be posted adjacent to the inspection certificate. The suspension of an inspection certificate shall continue in effect until the boiler has been made to conform to these rules and until the certificate has been reinstated. A fee shall be charged in accordance with R 408.4038 (2) for all follow-up visits by the chief inspector or deputy inspector.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4151 Defacing or removing certificate or numbers.**

Rule 151. No person except the chief inspector or a deputy inspector shall deface or remove any certificate of inspection or mark of identification number on a boiler.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4153 Operation of boiler under pressure without valid certificate prohibited; penalty.**

Rule 153. (1) A person, firm, partnership, or corporation shall not operate a boiler under pressure in this state to which these rules apply without a valid inspection certificate or at a pressure exceeding that specified on the inspection certificate.

(2) An owner or user who causes a boiler to be operated without possessing a valid certificate or at a pressure exceeding that specified on the inspection certificate is subject to the penalty prescribed in section 24 of the act.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 86, Eff. Jan. 16, 1976; 1979 AC; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4155 Boiler policies; newly written, canceled, or suspended.**

Rule 155. All insurance companies shall notify the chief inspector within 30 days of all boilers newly insured, canceled, not renewed, or suspended because of unsafe conditions.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4157 Notification; defective boilers.**

Rule 157. If a special inspector, upon the first inspection of a new risk, finds that the boiler or any of the appurtenances are in such condition that his company refuses insurance, the company shall immediately notify the chief inspector and submit a report of the defects.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4161 Defective conditions; external inspections.**

Rule 161. If, upon an external inspection, there is evidence of a leak or crack, enough of the covering of the boiler shall be removed to satisfy the inspector in order that he may determine the safety of the boiler; or if the covering cannot be removed at that time, he may order the operation of the boiler stopped until such time as the covering can be removed and proper examination made.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4163 Notification in case of accident that renders boiler inoperative.**

Rule 163. (1) If an accident occurs that renders a boiler inoperative, then the owner or user shall immediately notify the chief inspector. For a serious accident, notice shall be given immediately by the quickest method available, and neither the boiler nor any of its parts shall be removed or disturbed before an inspection has been made by the chief inspector, deputy inspector, or special inspector, unless the removal is to save human life. A condition or failure which results in bodily injury or physical damage to equipment or property other than the boiler or which creates a unique or unusual explosion hazard shall be reported as a serious accident.

(2) A detailed accident report shall be submitted by the owner's or user's insurance company boiler inspector on an accident report form furnished by the boiler division of the department. If a boiler is not insured, a state deputy boiler inspector shall submit the required report.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1954 ACS 56, **Eff. Nov. 14, 1968**; 1954 ACS 86, **Eff. Jan. 16, 1976**; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995**; 2002 MR 23, **Eff. Jan. 1, 2003**; **Eff. November 6, 2006**.

**R 408.4165 Restamping of boilers.**

Rule 165. When the stamping on a boiler becomes indistinct, the inspector shall instruct the owner or user to have it restamped. Request for permission to restamp the boiler shall be made to the chief inspector and proof of the original stamping shall accompany the request made to the chief inspector. Restamping authorized by the chief inspector shall be done only by an inspector, and shall be identical with the original stamping, except that it will not be required to restamp the ASME code symbol. Notice of completion of such restamping shall be filed with the chief inspector by the inspector who stamped the boiler, together with a facsimile of the stamping applied.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4167 Penalty for operation of unsafe boilers.**

Rule 167. If, upon inspection, a boiler is found to be in such a condition that it is unsafe to operate, the inspection certificate shall be suspended pursuant to section 20(4) of the act. A person, firm, partnership, or corporation causing such a boiler to be operated shall be subject to the penalty prescribed in section 24 of the act.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1954 ACS 86, **Eff. Jan. 16, 1976**; 1979 AC.

**R 408.4169 Condemned boilers.**

Rule 169. A boiler which has been inspected and declared unsafe by the chief inspector, deputy inspector or special inspector and which the owner has determined will be scrapped shall be stamped with the word “condemned.” The stamping shall be as shown by the following facsimile and shall be situated in several conspicuous locations determined by the inspector.

-CONDEMNED-

Any person, firm, partnership, or corporation using or offering for sale a condemned boiler for operation within this state shall be subject to the penalties provided in section 24 of the act.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995.**

**R 408.4171 Removal of used boilers from the state.**

Rule 171. (1) If an ASME boiler located in this state is to be moved to another state for temporary use or repairs, application shall be made by the owner to the chief inspector for permission to reinstall the boiler in this state as prescribed in R 408.4177.

(2) Repairs conducted outside of this state to boilers that will be reinstalled in this state shall be conducted by an organization in possession of a valid certificate of authorization to repair boilers. The organization shall conduct the repair in accordance with the NBIC and submit all forms required by the NBIC.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; **Eff. July 27, 2009.**

**R 408.4172 Nonstandard boilers; bringing into state.**

Rule 172. If a nonstandard boiler that is in use in this state is removed outside the boundaries of the state, it cannot be brought into the state and reinstalled without the permission of the board of boiler rules.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995.**

**R 408.4175 Inspection of used and secondhand boilers for reinstallation and operation.**

Rule 175. The owner or user shall ensure that all used and secondhand boilers are inspected by the chief inspector or a deputy inspector to determine compliance with these rules before approval for reinstallation. The chief inspector or deputy inspector may require a hydrostatic test. A used or secondhand boiler shall not be placed in operation until its installation has been approved for operation by the chief inspector or a deputy inspector.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4177 Reinstallation of used or secondhand boilers; fees.**

Rule 177. Reinstallation of a used or secondhand boiler shall only be performed by a licensed boiler installer. A permit fee prescribed by R 408.4038 shall be paid directly to the boiler division of the department and shall accompany the permit to reinstall a used or secondhand boiler.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1979 ACS 8, Eff. Dec. 9, 1981; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.**

**R 408.4179 Reinstalled boilers; fittings and appurtenances.**

Rule 179. The owner shall ensure that the installation of a reinstalled boiler conforms to the requirements of R 408.4031.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4182 Steam kettles.**

Rule 182. (1) A fired or electrically heated steam kettle, irrespective of size, that has piped feed connections shall be in compliance with these rules.

(2) A fired or electrically heated kettle, irrespective of size or feed piping connections, shall be in compliance with the requirements of these rules. The owner or user shall report the installation to the chief inspector before the unit is operated. The chief inspector shall assign a deputy inspector to visit the installation location to inspect the kettle to determine its safety for operation. A kettle that is operated at or below 15 psi shall be inspected biennially. A kettle that is operated at more than 15 psi shall be inspected annually.

History: 1954 ACS 56, Eff. Nov. 14, 1968; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.**

**R 408.4185 Safety appurtenances and controls.**

Rule 185. A person shall not attempt to remove, or shall not do any work upon, any safety appurtenance or control prescribed by these rules while a boiler is in operation. If an appurtenance or control is repaired during an outage of a boiler, it shall be reinstalled and in proper working order before the appurtenance or control is placed back in service. A person shall not load the safety valve or valves to maintain a working pressure of more than that stated on the certificate of inspection.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995.**

**R 408.4186 Rescinded.**

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 67, Eff. Mar. 31, 1971; 1954 ACS 86, Eff. Jan. 16, 1976; 1954 ACS 98, Eff. Jan. 24, 1979; 1985 MR 2, Eff. Mar. 7, 1985; 1995 MR 4, Eff. Apr. 21, 1995; **Eff. July 27, 2009.**

**R 408.4187 Prevention of contamination of potable water supply.**

Rule 187. The boiler owner shall ensure that a boiler has proper connections to the potable water supply system to prevent contamination. The connections shall be as specified in the Michigan plumbing code, R 408.30701 to R 408.30796.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4189 Air for combustion.**

Rule 189. The boiler owner shall ensure that a boiler has adequate outside combustion air as specified in the Michigan mechanical code R 408.30901a to R 408.30998a.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1999 MR 12, Eff. Jan. 4, 2000; 2002 MR 23, **Eff. Jan. 1, 2003.**

**R 408.4193 Stairways, ladders, platforms, and runways.**

Rule 193. (1) A platform shall be installed at 1 end of all drums of a water tube boiler that are more than 4 feet above the floor or walkway to permit safe access to the interior of the drums for cleanout and inspection.

(2) An inspector shall notify the chief inspector of an owner or user who is required to conform to this rule, and the chief inspector shall give written notice to the owner or user that the installation of the required stairway, runway, platform, or ladder is to be made. The owner or user shall be allowed 1 year from the date of the chief inspector's notification to complete the work.

(3) A licensee may request a deviation from the requirements of this rule by submitting drawings to the chief inspector for review and approval before installation of the boiler. The licensee will be notified by the chief inspector of the approval or denial of the request.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 61, Eff. Nov. 14, 1968; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. July 27, 2009.**

**R 408.4195 Exits from boiler rooms.**

Rule 195. The owner shall ensure that the exit from a boiler room complies with the requirements specified in the Michigan building code, R 408.30401 to R 408.30547.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; **Eff. July 27, 2009.**

**R 408.4197 Clearance between boilers and other objects.**

Rule 197. (1) A licensee performing an installation shall assure that a minimum clearance of 24 inches is provided between a boiler, its controls, firing equipment, and appurtenances and the building walls and partitions or other boilers or machinery. The licensee shall assure that clearances are in accordance with the manufacturer's instructions where required clearances are greater than the minimum required by this

rule. The boiler owner shall assure that the clearances are maintained for the life of the boiler and shall not be infringed upon by items in storage.

(2) The elevation of a boiler above the floor shall be as specified in the Michigan mechanical code, R 408.30901 to R 408.30998.

(3) A licensee may request a deviation from the requirements of this rule by submitting drawings to the chief inspector for review and approval before installation of the boiler. The licensee shall be notified by the chief inspector of the approval or denial of the request.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 61, Eff. Feb. 16, 1970; 1979 AC; 2002 MR 23, Eff. Jan. 1, 2003; Eff. November 6, 2006; **Eff. July 27, 2009.**

## **PART 2. EXISTING INSTALLATIONS**

### **STEAM BOILERS**

***See page 37. The rules in Part 2 affect only those steam boilers in actual use, or installed for use prior to August 10, 1917, and hot water heat boilers in actual use at the time the act became effective (July 1, 1966).***

## **PART 3. INSPECTION AND TESTING FOR NEW CONSTRUCTION; INSTALLATION AND ALTERATION OF BOILERS AND PIPING**

### **R 408.4301 Scope.**

Rule 301. All boilers and piping constructed for use in this state shall be inspected and tested during construction as required by the applicable ASME code sections that are adopted by reference in R 408.4025, R 408.4027, and R 408.4032. Any alterations to an existing boiler or piping shall be accomplished in accordance with these rules for new construction.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, **Eff. Jan. 1, 2003.**

### **R 408.4302 Boiler installation.**

Rule 302. (1) A boiler shall be installed by a licensed boiler installer in accordance with the requirements of the applicable ASME code referenced in R 408.4031 and as may be required by these rules.

(2) A boiler installer shall file welding procedure specifications and the procedure qualification reports qualified in accordance with the requirements of the ASME code, section IX, welding and brazing qualifications, with the boiler division of the department, before performing any installations requiring welding.

(3) A boiler installer utilizing welding during installation shall have welding procedure specifications, welder performance qualifications, and a quality control manual or procedures to be used or which were used in the conduct of the installation available for the inspector's review.

History: 1954 ACS 81, Eff. Nov. 7, 1974; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.**

## **PART 5. INSERVICE INSPECTION OF BOILERS**

### **R 408.4501 Inspection.**

Rule 501. The inspection of boilers as provided for under part 1 of these rules shall be made in accordance with the requirements of the NBIC, except as modified by these rules.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, **Eff. Jan. 1, 2003.**

### **R 408.4503 Owner or user to prepare boiler for inspection.**

Rule 503. All boilers and blowoff vessels, except for a boiler which is exempted by these rules, shall be prepared for inspection in accordance with the NBIC and these rules by the owner or user when notified by the chief inspector, deputy inspector, or special inspector. The owner or user shall ensure that all examinations and tests required by the inspector are performed.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; **Eff. November 6, 2006.**

### **R 408.4507 Pressure testing.**

Rule 507. The inspector may require a pressure test to assess leak tightness of the pressure retaining item. Pressure testing methods shall be as described in the NBIC.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 56, Eff. Nov. 14, 1968; 1954 ACS 81, Eff. Nov. 7, 1974; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; 2002 MR 23, Eff. Jan. 1, 2003; Eff. November 6, 2006; **Eff. July 27, 2009.**

### **R 408.4510 Traction boilers.**

Rule 510. (1) A traction boiler is a boiler designed for the express purpose of pulling farm equipment or to convert steam power into flywheel energy driving farm apparatus, such as thrashers, saws, or grinding equipment. Such boilers shall be subject to the following provisions:

(a) They shall be tested hydrostatically every 3 years to a hydrostatic pressure of 1 ½ times working pressure, held for sufficient time to permit visual observation of all seams, joints, supports, and attachments.

(b) All seams, attachments, supports, and joints shall be exposed for each such annual inspection.

(2) Traction boilers used for display or hobby purposes shall not be operated for any other purpose but that for which they were originally constructed.

(3) Lap seam boilers shall not be operated in excess of 100 psi.

(4) Any repairs by welding or riveting to traction boilers shall be made by licensed repair shops only after an approved permit has been obtained and subject to the approval of the inspector before and after repair is made.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; (1995); **Eff. November 6, 2006.**

**R 408.4511 Nonvaporizing organic fluid boilers.**

Rule 511. (1) A nonvaporizing organic fluid boiler is a boiler designed to heat, but not vaporize, a fluid in a closed system.

(2) The owner shall ensure that a nonvaporizing organic fluid boiler is constructed in accordance with the ASME boiler and pressure vessel code.

(3) The owner shall ensure that stop valves are located at an accessible point in the supply and return pipe connections as near the boiler as is practicable.

(4) The owner shall ensure that a nonvaporizing organic fluid boiler has the following minimum equipment:

(a) One operating temperature control and 1 high limit temperature control.

(b) A relief valve of sufficient capacity to relieve the excess thermal fluid as a result of thermal expansion verified by engineering calculations provided by the owner or user.

(c) A thermometer graduated to not less than 133% of the expected operating temperature.

(d) A pressure gauge graduated to not less than 150% of the expected operating pressure.

(e) A low level or flow sensing device suitable for operating conditions.

(5) The owner shall ensure that a fuel train meets the requirements of ASME code CSD-1.

History: 1999 MR 12, Eff. Jan. 4, 2000; **Eff. November 6, 2006.**

**R 408.4512 Miniature hobby locomotive boilers.**

Rule 512. (1) A miniature hobby locomotive boiler is designed to be operated on a narrow gauge track of less than 24 inches.

(2) At the initial inspection of a miniature hobby locomotive boiler, the owner shall provide the chief boiler inspector with design specifications and calculations for review and acceptance. If a boiler is approved for use, then the boiler division of the department shall issue an identifying state number and a deputy boiler inspector shall attach it to the boiler.

(3) The owner shall ensure that a miniature hobby locomotive boiler has the following minimum equipment:

(a) A pressure gauge graduated to approximately 1 ½ times the operating pressure, but not more than 4 times the operating pressure.

(b) A means to extinguish the fire in the firebox if of a low water condition.

(c) Two means of feeding water to the boiler, 1 of which shall be operable while the locomotive is stationary.

(d) A water level gauge glass located so that the top of the bottom nut of the gauge glass is approximately 10% of the distance between the crown sheet and the shell, but not less than ½ inch above the crown sheet.

(e) Two safety valves set at not more than 10% above the operating pressure for boilers fabricated after the effective date of the rules. The capacity of the safety valves shall be equal to or greater than the calculated steam generating capacity of the boiler.

(4) The owner shall determine the maximum allowable working pressure of a miniature hobby locomotive boiler by calculation. In place of acceptable calculations, the owner shall subject the boiler to a hydrostatic pressure test of 1 ½ times the owner specified operating pressure.

(5) Triennially, during the certificate inspection, the owner shall hydrostatically test the boiler to not more than 1 ½ times the operating pressure.

(6) The boiler division of the department shall develop procedures, policies, and check lists necessary to accomplish the inspections and tests required by these rules.

(7) Repairs to miniature hobby locomotive boilers are exempt from the licensing and permitting requirements of the act. Repair welding shall be made in accordance with the requirements of ASME code section IX. Welding procedures and performance qualification shall be filed with the boiler division of the department for review.

History: 2000 MR 1, Eff. Jan. 27, 2000; **Eff. Novmeber 6, 2006.**

**R 408.4515 Plant personnel to conduct test of boiler attachments or apparatus in presence of inspector.**

Rule 515. If boiler attachments or apparatus require testing, then plant personnel shall perform the test in the presence of the inspector, unless otherwise ordered.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, **Eff. Jan. 4, 2000.**

**R 408.4520 Failure to prepare boiler for internal inspection.**

Rule 520. If a boiler has not been properly prepared for an internal inspection or the owner or user fails to comply with the requirements for hydrostatic test as set forth in these rules, the inspector may decline to make the inspection or test and the certificate of inspection shall be withheld until the owner or user complies with the requirements.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4522 Stripping of riveted boiler to determine required data.**

Rule 522. If a riveted boiler is jacketed so that the longitudinal seams of shells, drums, or domes cannot be seen, and if data cannot be determined by other means, enough of the jacketing, setting wall, or other form of casing or housing shall be removed so that the size of the rivets, pitch of the rivets, and other data necessary to determine the safety of the boiler may be obtained.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995.**

**R 408.4566 Inspection and testing of safety valves and safety relief valves.**

Rule 566. Inspection and testing of safety valves and safety relief valves shall be conducted in accordance with the NBIC. The manual lift test addressed in the NBIC at RB-8400 may be used instead of the pressure test required by RB-8410.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; **Eff. November 6, 2006.**

**R 408.4570 Safety valve setting on boilers with direct feed.**

Rule 570. If a boiler is supplied with feedwater directly from water mains without utilizing feeding apparatus, except for return traps, the safety valve shall not be set at a pressure higher than 94% of the lowest operating pressure obtained in the supply main feeding the boiler.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995.**

**R 408.4575 Replacement of heating or process boiler safety and relief valves.**

Rule 575. When it becomes necessary to replace safety or relief valves on low pressure heating or process boilers for any reason, the replacement shall be made with other than top-outlet type valves.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4581 Rerolling tubes.**

Rule 581. Rerolling a tube is considered maintenance, except rerolling a tube required as a result of an accident is considered a repair. This repair work shall require a repair permit and shall be performed by a licensed repairer.

History: 1954 ACS 56, **Eff. Nov. 14, 1968**; 1979 AC.

## **PART 6. REPAIR OF BOILERS**

### **SCOPE OF RULES FOR REPAIR BY RIVETING**

**R 408.4601 Repair to riveted boilers.**

Rule 601. Repairs to riveted boilers by riveting require the prior approval of the boiler division of the department. The repairs shall be conducted in accordance with the NBIC.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.**

**R 408.4626 Repairs by welding.**

Rule 626. Repairs to boilers and piping shall be conducted in accordance with the NBIC.

History: 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan 4, 2000; **Eff. November 6, 2006.**

## **PART 7. BOILER BLOWOFF SYSTEMS**

### **R 408.4701 Design and construction of blowdown vessel reports.**

Rule 701. (1) The owner shall ensure that blowdown vessels for use in the state of Michigan are designed and constructed as prescribed by these rules and the ASME boiler and pressure vessel code, section VIII, division 1, entitled "Unfired Pressure Vessels," 2007 edition, and its 2008a addenda which are adopted by reference in these rules and are available for inspection at the Michigan Department of Energy, Labor & Economic Growth, Bureau of Construction Codes, 6546 Mercantile Way, Lansing, Michigan 48911 or from the ASME International, 22 Law Drive, Fairfield, New Jersey 07007, at a cost as of the time of adoption of these amendatory rules of \$610.00. National board of boiler and pressure vessel inspector document NB-27, 2004 edition, may be used as a guide for the design of blowdown tanks.

(2) The owner shall ensure that a blowdown vessel has a minimum allowable working pressure of 50 psig and that the installation complies with these rules and the vessel manufacturer's instructions.

(a) The blowdown vessel, its fittings, and connections shall be sized so that the internal pressure does not rise more than 5 psig above ambient pressure during the blowdown.

(b) The blowdown vessel shall be provided with adequate openings to facilitate internal cleaning and inspection. An internal inspection of the blowdown vessel shall be conducted during the certificate inspection of the boiler.

(c) The blowdown vessel shall be provided with the following fittings and connection openings in addition to those provided by the manufacturer for the proper installation and operation of the vessel:

(i) A vent connection.

(ii) A drain connection. A drain connection is not required on a separator.

(iii) A thermometer that has a maximum scale reading of 300 degrees Fahrenheit and that is located in the water outlet from the blowdown vessel.

(iv) A pressure gauge that is graduated from 0 to 30 psig and that is attached to the top of the steam space of the blowdown vessel.

(d) The blowdown vessel shall be installed in a location that prevents it and its connected piping from freezing and shall be installed in a manner that permits both internal and external inspection.

(3) A manufacturer shall provide the boiler division of the department, with the manufacturer's data reports. A data report that is signed by an authorized inspector, together with the ASME code symbol stamp on the vessel, is the record denoting that the blowdown vessel has been constructed in accordance with the ASME code.

(4) The manufacturer shall register all blowdown vessels for use in the state of Michigan with the national board of boiler and pressure vessel inspector.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 56, Eff. Nov. 14, 1968; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 1999 MR 12, Eff. Jan. 4, 2000; Eff. November 6, 2006 ; **Eff. July 27, 2009.**

**R 408.4711 Safe discharge from blowdown system.**

Rule 711. A safe point of discharge from a blowdown system shall protect personnel and property from the injurious effects of the discharge and shall not exceed 140 degrees Fahrenheit at the outlet of the blowdown vessel. All safe points of discharge shall be in compliance with all federal, state, and local regulations governing discharges.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; 2002 MR 23, Eff. Jan. 1, 2003; **Eff. November 6, 2006.**

**PART 15. HEARINGS**

**R 408.5501 Conduct of hearings.**

Rule 1501. Hearings shall be conducted as prescribed by Act No. 306 of the Public Acts of 1969, as amended, being §24.201 et seq. of the Michigan Compiled Laws.

History: 1954 ACS 61, Eff. Feb. 16, 1970; 1979 AC; 1995 MR 4, Eff. Apr. 21, 1995; **Eff. November 6, 2006.**

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*The rules in Part 2 affect only those steam boilers in actual use, or installed for use prior to August 10, 1917, and hot water heat boilers in actual use at the time the act became effective (July 1, 1966).*

\*\*\*\*\*

**PART 2. EXISTING INSTALLATIONS  
STEAM BOILERS**

**R 408.4201 Existing steam boilers.**

Rule 201. "Existing steam boilers," as used in this part, mean steam boilers that are in actual use, or which are installed and ready for use prior to August 10, 1917. It should not be applied to secondhand boilers, rental boilers, or to boilers that are subject to change in ownership or are to be reset, in which case the rules for new construction shall apply.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4202 Age limit of nonstandard existing steam boilers.**

Rule 202. The age limit of any boiler of nonstandard construction, installed prior to the date this law became effective, shall be 30 years except that after a thorough internal and external inspection and a hydrostatic pressure of 1 1/2 times the allowable working pressure and held for a period of at least 30 minutes, during which no distress or leakage develops, any boilers having other than a lap-riveted longitudinal joint may be continued in operation without reduction in working pressure.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4203 Age limit of lap seam boilers.**

Rule 203. The age limit of any boiler having lap-riveted longitudinal joints and operating at a pressure in excess of 50 psi shall be 20 years; this type of boiler, when removed from an existing setting, shall not be reinstalled for a pressure in excess of 15 psi. A reasonable time for replacement, not to exceed 1 year, may be given at the discretion of the chief inspector.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4205 Lap seam crack.**

Rule 205. The shell or drum of a boiler in which a typical "lap seam crack" is discovered along a longitudinal riveted joint or lap joints shall be permanently discontinued for use under pressure. By "lap seam crack" is meant the typical crack frequently found in lap seams extending parallel to the longitudinal joint and located either between or adjacent to rivet holes.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4206 Age limit of standard existing boilers.**

Rule 206. The age limit of boilers of standard construction shall be dependent on a thorough internal and external inspection and hydrostatic pressure test of 1 1/2 times the allowable working pressure for a period of 30 minutes. If the boiler under these test conditions exhibits no distress or leakage, it may be continued in operation at the same working pressure.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4207 Factors of safety.**

Rule 207. (1) The lowest factor of safety that will be permissible on existing installations under any conditions is 4.5. Secondhand boilers shall have a minimum factor of safety of 5 when the longitudinal joints are of butt- and double-strap construction, and a minimum factor of safety of 6 when the longitudinal joints are of lap-riveted construction. Horizontal-return tubular boilers having continuous lap-riveted joints of more than 12 feet in length shall have a factor of safety of not less than 8.

(2) The factors of safety for all standard boilers having longitudinal joints other than lap-riveted construction shall be increased at the end of its specified age limit by not less

than 5/10, except that after a thorough internal and external inspection and a hydrostatic pressure test of 1 1/2 times the pressure allowed and held for a period of at least 30 minutes, during which no distress or leakage develops, the pressure may be continued at a factor of 5.5. These factors may be increased by the inspector as the condition and safety of the boiler may dictate, and in no case shall the factor of safety be less than called for by the rules for new construction.

(3) In no case shall the maximum allowable working pressure on old boilers be increased, unless they are being operated at a lesser pressure than would be allowable for new boilers, in which case the changed pressure shall not exceed that allowable for new boilers of the same construction.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4208 Portable boilers.**

Rule 208. Portable boilers, such as used by contractors, agriculturists, sawmills, etc., used for purely portable purposes and transported from place to place, shall be deemed secondhand in the event of change of ownership, irrespective of change of location, and shall comply with the rules for new construction when reinstalled at a new location. They shall have a factor of safety of at least 5.5 where of butt-strap construction and a factor of safety of not less than 6 where of lap-seam construction.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4210 Cast-iron headers and mud drums.**

Rule 210. The maximum allowable working pressure on a water-tube boiler, the tubes of which are secured to cast-iron or malleable-iron headers, or which have cast-iron mud drums, shall not exceed 160 psig. The maximum allowable working pressure of a steam boiler constructed wholly or principally of cast iron shall not exceed 15 psi. Hot water boilers operating at temperatures not to exceed 250 degrees Fahrenheit may be operated at pressures up to 160 psi.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4212 Maximum allowable working pressure.**

Rule 212. (1) The maximum allowable working pressure on the shell or drum of a boiler shall be determined by the strength of the weakest section of the structure, computed from the thickness of the plate, the tensile strength of the plate, the efficiency of the longitudinal joint or of the ligaments between tube holes in the shell or drum (whichever is the least), the inside diameter of the outside course and the factor of safety allowed by these rules.

$$\frac{TStE}{RFS} = \text{Maximum allowable working pressure, psi}$$

where TS = ultimate tensile strength of shell plates, psi.  
t = minimum thickness of shell plate, in weakest course, inches.  
E = efficiency of longitudinal joint:

For riveted construction, E shall be determined by the rules based on the ratio which the strength of the joint bears to the strength of the solid plate.

For fusion-welded construction, E shall be determined by the rules applying to the class of welding used.

For tube ligaments, E shall be determined by the rules based on the ratio of the cross-sectional area of the ligaments to the entire section of the plate.

For seamless construction, E shall be considered 100%.

R = one half the inside diameter of the weakest course of shell or drum, inches.

FS = factor of safety permitted by these rules.

(2) When the tensile strength of steel or wrought-iron shell plates is not known, it shall be taken as 55,000 psi for steel and 45,000 psi for wrought iron.

(3) In computing the efficiency of riveted joints, the resistance to crushing of mild steel shall be taken as 95,000 psi of cross-sectional area.

(4) When computing the ultimate strength of rivets in shear, the following values in pounds per square inch of the cross-sectional area of the rivet shank shall be used:

Iron rivets in single shear . . . . .	38,000
Iron rivets in double shear . . . . .	76,000
Steel rivets in single shear . . . . .	44,000
Steel rivets in double shear . . . . .	88,000

When the diameter of the rivet holes in the longitudinal joints of a boiler is not known, the diameter and cross-sectional area of rivet shanks may be selected from table 1, or they may be ascertained by cutting out 1 rivet in the body of the joint.

(5) In no case shall a boiler be designed for a pressure less than 30 psi.

Table 1  
Sizes of Rivets Based on Plate Thickness

Thickness of plate, inches	1/4	9/32	5/16	11/32	3/8	13/32
Diameter of rivet after driving, inches	11/16	11/16	3/4	3/4	13/16	13/16
Thickness of plate, inches	7/16	15/32	1/2	9/16	5/8	-----
Diameter of rivet after driving, inches	15/16	15/16	15/16	1 1/16	1 1/16	-----

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4214 Safety and safety relief valves.**

Rule 214. A person shall not use weighted-levered safety valves or safety valves that have a seat or disk made of cast iron. Valves of this type of construction shall be replaced by direct spring-loaded pop-type valves or safety relief valves that are in compliance with the requirements of the ASME power boiler code and shall be connected to the boiler with the spindle vertical.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC; 1995 MR 4, **Eff. Apr. 21, 1995**.

**R 408.4215 Number of safety valves.**

Rule 215. Each boiler shall have at least 1 safety valve; and if power boilers have more than 500 square feet of water-heating surface, such boilers shall have 2 or more safety valves.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4216 Safety valve connections.**

Rule 216. The valve or valves shall be connected to the boiler, independent of any other steam connection, and attached as close as possible to the boiler, without unnecessary intervening pipe or fittings. Where alteration is required to conform to this requirement, owners or users shall be allowed reasonable time in which to complete the work.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4217 Safety valve discharge pipes.**

Rule 217. No valves of any description shall be placed between the safety valve and the boiler nor on the escape pipe between the safety valve and the atmosphere. When an escape pipe is used, it shall be full size of the safety valve discharge and fitted with an open drain to prevent water lodging in the upper part of the safety valve or escape pipe. When an elbow is placed on a safety valve escape pipe, it shall be located close to the safety valve outlet and the escape pipe shall be anchored and supported securely. All safety valve discharges shall be so located or piped as to be carried clear from walkways or platforms used for access to main stop valves of boilers or steam headers.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4218 Safety valve capacity.**

Rule 218. The safety valve capacity of each boiler shall be such that the safety valve or valves will discharge all the steam that can be generated by the boiler without allowing the pressure to rise more than 6% above the highest pressure to which any valve is set, and in no case to more than 6% above the maximum allowable working pressure. The steam safety valve capacity for each steam heating boiler shall be such that with the fuel-burning equipment installed, the pressure cannot rise more than 5 psi above the maximum allowable working pressure of the boiler.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4219 Safety valve pressure setting.**

Rule 219. One or more safety valves on every boiler shall be set at or below the maximum allowable working pressure. The remaining valves may be set within a range of 3% above the maximum allowable working pressure, but the range of setting of all of the safety valves on a boiler shall not exceed 10% of the highest pressure to which any valve is set.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4220 Safety valves on connected boilers of different pressures.**

Rule 220. When 2 or more boilers operating at different pressures and safety valve settings are interconnected, the lower pressure boilers or interconnecting piping shall be equipped with safety valves of sufficient capacity to prevent overpressure, considering the maximum amount of steam that can flow into the lower pressure system.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4222 Safety valve setting on boilers with direct feed.**

Rule 222. In those cases where the boiler is supplied with feedwater directly from water mains without the use of feeding apparatus (not to include return traps), no safety valve shall be set at a pressure higher than 94% of the lowest pressure obtained in the supply main feeding the boiler.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4223 Determining safety valve capacity.**

Rule 223. (1) The relieving capacity of the safety valves on any boiler shall be checked by 1 of the 3 following methods and, if found to be insufficient, additional valves shall be provided:

(a) By making the accumulation test, which consists of shutting off all other steam discharge outlets from the boiler and forcing the fires to the maximum. The safety valve capacity shall be sufficient to prevent a rise of pressure in excess of 6% of the maximum allowable working pressure. This method should not be used on a boiler with a superheater or reheater.

(b) By measuring the maximum amount of fuel that can be burned and computing the corresponding evaporative capacity (steam generating capacity) upon the basis of the heating value of this fuel. These computations shall be made as outlined in the appendix of the ASME power boiler code.

(c) By measuring the maximum amount of feedwater that can be evaporated.

(2) When either of the methods outlined in subrule (1) (b) or (c) is employed, the sum of the safety valve capacities shall be equal to or greater than the maximum evaporative capacity (maximum steam generating capacity) of the boiler.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4225 Replacement of safety valves.**

Rule 225. When it becomes necessary to replace safety or relief valves on low pressure heating or process boilers for any reason, the replacement shall be made with other than a top-outlet type valve.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4230 Means of boiler feeding.**

Rule 230. Each boiler shall have a feed supply which will permit it to be fed at any time while under pressure. A power boiler having more than 500 square feet of water heating surface shall have at least 2 means of feeding, 1 of which shall be an approved feed pump, injector, or inspirator, except boilers fired by gaseous, liquid, or solid fuel in suspension may be equipped with a single source of feeding provided means are provided for immediate shutoff of heat release, and the boiler furnace and fuel system do not retain sufficient stored heat to cause damage to the boiler if the feed supply is interrupted. A source of feed directly from water mains at a pressure of 6% greater than the release pressure of the safety valve with the highest setting may be considered 1 of the means.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4232 Introduction of feedwater into boilers.**

Rule 232. The feedwater shall be introduced into power and heating boilers in such manner that it will not be discharged close to riveted joints of shell or furnace sheets or directly against surfaces exposed to products of combustion, or to direct radiation from the fire.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4235 Feed valves required.**

Rule 235. The feed piping to a power boiler shall be provided with a check valve near the boiler and a valve or cock between the check valve and the boiler. When 2 or more boilers are fed from a common source, there shall also be a valve on the branch to each boiler between the check valve and source of supply. Whenever a globe valve is used on feed piping, the inlet shall be under the disk of the valve. In all cases where returns are fed back to power or heating boilers by gravity, there shall be a check valve and stop valve in each return line, the stop valve to be placed between the boiler and the check valve, and both shall be located as close to the boiler as is practicable.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4236 Feedwater temperature.**

Rule 236. Where deaerating heaters are not employed, it is recommended that the temperature of the feedwater be not less than 120 degrees Fahrenheit to avoid the possibility of setting up localized stress. Where deaerating heaters are employed, it is recommended that the minimum feedwater temperature be not less than 215 degrees Fahrenheit so that dissolved gases may be thoroughly released.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4240 Water column connections.**

Rule 240. No outlet connections (except for damper regulator, feedwater regulator, low-water fuel cut-out, drains, steam gauges, pressure controls or such apparatus that does

not permit the escape of an appreciable amount of steam or water therefrom) shall be placed on the piping that connects the water column to the boiler. The water column shall be provided with a valved drain of at least 3/4 inches pipe size, the drain to be piped to a safe location.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

#### **R 408.4241 Gauge cocks.**

Rule 241. Each power boiler shall have 3 or more gauge cocks, located within the visible length of the water glass, except when the boiler has 2 water glasses located on the same horizontal lines. Boilers not over 36 inches in diameter, in which the heating surface does not exceed 100 square feet, need have but 2 gauge cocks. For all installations where the water gauge glass or glasses are more than 30 feet above the boiler operating floor, it is recommended that water-level indicating or recording gauges be installed at eye height above the operating floor.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

#### **R 408.4242 Pressure gauges.**

Rule 242. (1) Each steam boiler shall have a pressure gauge, with dial range not less than 1 1/2 times the maximum allowable working pressure, connected to the steam space or to the steam connection to the water column.

(2) The pressure gauge shall be connected to a siphon or equivalent device of sufficient capacity to keep the gauge tube filled with water and so arranged that the gauge cannot be shut off from the boiler except by a cock placed near the gauge and provided with a tee or lever handle arranged to be parallel to the pipe in which it is located when the cock is open.

(3) When a pressure gauge connection longer than 8 feet becomes necessary, a shutoff valve may be used near the boiler provided the valve is of the outside-screw-and-yoke type and is locked open. The line shall be of ample size with provision for free blowing.

(4) Each boiler shall be provided with a 1/4 inch nipple and globe valve connected to the steam space for the exclusive purpose of attaching a test gauge when the boiler is in service so that the accuracy of the boiler pressure gauge may be ascertained.

(5) The scale on the dial of a steam heating boiler shall be graduated to not less than 30 psi. The travel of the pointer from 0 to 30 psi shall be at least 3 inches.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

#### **R 408.4244 Stop valves.**

Rule 244. (1) Each steam outlet from a power boiler (except safety valve connections) shall be fitted with a stop valve located as close as practicable to the boiler.

(2) When a stop valve is so located that water can accumulate, ample drains shall be provided. The drainage shall be piped to a safe location and shall not be discharged on the top of the boiler or its setting.

(3) When power boilers provided with manholes are connected to a common steam main, the steam connection from each boiler shall be fitted with 2 stop valves having an ample free-blow drain between them. The discharge of the drain shall be visible to the operator while manipulating the valves and shall be piped clear of the boiler setting. The stop valves shall consist preferably of 1 automatic nonreturn valve (set next to the boiler) and a second valve of the outside-screw-and-yoke type.

(4) A stop valve shall be used in each supply and return pipe connection of 2 or more heating boilers connected to a common system.

(5) When a stop valve is used in the supply pipe connection of a single heating boiler, there shall be 1 used in the return pipe connection.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

#### **R 408.4246 Blowoff connections; existing power boilers.**

Rule 246. (1) The construction of the setting around each blowoff pipe shall permit free expansion and contraction. Careful attention shall be given to the problem of sealing these setting openings without restricting the movement of the blowoff piping.

(2) All blowoff piping, when exposed to furnace heat, shall be protected by firebrick or other heat-resisting material, so constructed that the piping may be inspected readily.

(3) Each boiler shall have a blowoff pipe, fitted with a valve or cock, in direct connection with the lowest water space. Cocks shall be of the gland or guard type and suitable for the pressure allowed. The use of globe valves shall not be permitted.

(4) When the allowable working pressure exceeds 100 psi gauge, each blowoff pipe shall be provided with 2 valves or a valve and cock, such valves and cocks to be at least of the extra-heavy type.

(5) When the maximum allowable working pressure exceeds 100 psi gauge, blowoff piping shall be at least extra-heavy and shall be run full size without use of reducers or bushings. The piping shall be at least extra-heavy wrought iron or steel and shall not be galvanized.

(6) All fittings between the boiler and blowoff valve shall be of steel. In case of renewal of blowoff pipe or fittings, they shall be installed in accordance with the rules and regulations for new installations.

(7) Each steam heating boiler shall have a blowoff pipe connection fitted with a valve or cock not less than 3/4 inches pipe size connected with the lowest water space practicable.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

### **HOT WATER HEATING AND SUPPLY BOILERS**

#### **R 408.4251 Existing hot water boilers.**

Rule 251. "Existing hot water boilers," as used in this part, means hot water boilers which are in actual use, or which were installed and ready for use at the time the act became effective. It should not be applied to secondhand boilers, or to boilers that are subject to change in ownership, or are to be reset, in which case the rules for new construction should apply.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4253 Hot water boilers included; exempted.**

Rule 253. (1) These rules for hot water boilers shall apply to all hot water heating and hot water supply boilers to be designed for pressures not exceeding 160 psi and temperatures not exceeding 250 degrees Fahrenheit.

(2) For conditions exceeding those specified above, the rules for power boilers shall apply.

(3) Except as provided in R 408.4253(4), the following classifications are considered not to be within the jurisdiction of this part of these rules: hot water supply boilers which are directly fired with oil, gas, or electricity when none of the following limitations is exceeded:

(a) A heat input of 200,000 Btu per hour.

(b) A water temperature of 200 degrees Fahrenheit.

(c) A nominal water-containing capacity of 120 gallons.

(4) All hot water supply boilers, including those exempted in R 408.4253(3) shall be equipped with safety devices of proper type and size as specified in R 408.4278 and be of code construction.

(5) For conditions exceeding those specified in subrule (1), cast-iron construction is not permitted.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4255 Working pressure and temperature; hot water steel-plate boilers.**

Rule 255. (1) Wherever the term "maximum allowable working pressure" is used herein, it refers to gauge pressure or the pressure above the atmospheric in pounds per square inch. The maximum allowable working temperature at or near the outlet of a hot water steel-plate boiler shall not exceed 250 degrees Fahrenheit, nor the maximum allowable working pressure to 160 psi. The maximum allowable working pressure on the shell or drum of steel-plate hot water boilers shall be determined in accordance with the following formulas. In no case shall a boiler be designed for a pressure less than 30 psi.

$$P = \frac{SEt}{R + 0.6t} \quad \text{or} \quad t = \frac{PR}{SE - 0.6P}$$

where P = maximum allowable working pressure, pounds per square inch.

S = 20% of the minimum ultimate tensile strength stamped on the shell plate, or as indicated in (2).

t = minimum thickness of shell plates in weakest course, inches.

E = efficiency of longitudinal joint or of ligament between tube holes (whichever is the lesser).

R = inside radius of weakest course of the shell or drum, inches.

(2) When the tensile strength of steel or wrought-iron shell plates is not known, it shall be taken as 55,000 psi for steel and 45,000 psi for wrought iron.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4257 Working temperature; cast-iron hot water boilers.**

Rule 257. The maximum allowable working temperature at or near the outlet of a hot water cast-iron boiler shall not exceed 250 degrees Fahrenheit.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4258 Washout openings; other than cast-iron boilers.**

Rule 258. All boilers other than cast-iron shall be provided with suitable manhole openings or handhole or washout plug openings to permit inspection and permit removal of any sediment which may accumulate.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 86, **Eff. Jan. 16, 1976**; 1979 AC.

**R 408.4259 Washout openings; cast-iron boilers.**

Rule 259. All cast-iron steam and hot water boilers shall be provided with suitable washout openings to permit the removal of any sediment that may accumulate therein.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC

**R 408.4260 Furnace access openings.**

Rule 260. A firedoor or other access opening, not less than 11 x 15 inches or 10 x 16 inches or 15 inches in diameter, shall be provided for the furnace of an internally fired boiler other than cast-iron which the least furnace dimension is 28 inches or over.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4263 Threaded connections.**

Rule 263. Pipe connections, if threaded, shall be tapped into material having a minimum thickness as specified in table HG-370, except that when a curved surface is to be tapped the minimum thickness shall be sufficient to permit at least 4 full threads to be engaged.

Table HG-370  
Minimum Thickness of Material for Threaded Connections to Boilers

Size of Pipe Connection, Inches	Minimum Thickness of Material Required, Inches
Under 3/4	1/4
3/4 to 1, inclusive	5/16
1 1/4 to 2 1/2, inclusive	7/16
3 to 3 1/2, inclusive	5/8

4 to 5, inclusive	7/8
6 to 8, inclusive	1
9 to 12, inclusive	1 1/4

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4265 Minimum distance required between boiler and floor.**

Rule 265. Boilers other than cast iron of the wet-bottom type having an external width of over 36 inches shall have not less than 12 inches between the bottom of the boiler and the floor line, with access for inspection. When the width is 36 inches or less, the distance between the bottom of the boiler and the floor line shall be not less than 6 inches and when any part of the wet bottom is not farther from an outer edge than 12 inches, it shall be not less than 4 inches.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4267 Minimum size access door in a boiler setting.**

Rule 267. The minimum size of access door used in a boiler setting shall be 12 x 16 inches or equivalent area, the least dimension being 11 inches.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4268 Feedwater connections.**

Rule 268. Feedwater, make-up water, or water treatment shall be introduced into a boiler through the return piping system or through an independent feedwater connection which does not discharge against parts of the boiler exposed to direct radiant heat from the fire. Feedwater, make-up water, or water treatment shall not be introduced through openings or connections provided for inspection or cleaning, safety valve, safety-relief valve, surface or main blowoff, water column, water gauge glass, pressure gauge, or temperature gauge.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4269 Oil heaters.**

Rule 269. A heater for oil or other liquid harmful to boiler operation shall not be installed directly in the water space within a boiler.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4270 Provisions for thermal expansion in hot water system.**

Rule 270. (1) All hot water heating systems incorporating hot water tanks or fluid relief columns shall be so installed as to prevent freezing under normal operating conditions.

(2) If the system is equipped with an open expansion tank, an indoor overflow from the upper portion of the expansion tank shall be provided in addition to an open vent. The indoor overflow shall be carried within the building to a suitable plumbing fixture or to the basement.

(3) If the system is of the closed type, an airtight tank or other suitable air cushion shall be installed that will be consistent with the volume and capacity of the system, and shall be suitably designed for a hydrostatic test pressure of 2 1/2 times the allowable working pressure of the system. Expansion tanks for systems designed to operate at or above 30 psi shall be constructed in accordance with the provisions of section VIII of the ASME boiler and pressure vessel code, 1983 edition, and its addenda. Provisions shall be made for draining the tank without emptying the system, except for pressurized tanks.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1979 AC; 1985 MR 2, **Eff. Mar. 7, 1985.**

**R 408.4272 Minimum capacity of closed-type tank.**

Rule 272. The minimum capacity of the closed-type expansion tank may be determined from tables 272A and 272B or from the following formula where the necessary information is available.

$$V_t = \frac{(0.00041 T - 0.0466)V_s}{\frac{P_a - P_a}{P_f - P_o}}$$

- where  $V_t$  = minimum volume of tanks, gallons.
- $V_s$  = volume of system, not including tanks, gallons.
- T = average operating temperature, degrees Fahrenheit.
- $P_a$  = atmospheric pressure, psia.
- $P_f$  = fill pressure, psia.
- $P_o$  = maximum operating pressure, psia.

**TABLE 272A**

**EXPANSION TANK CAPACITY FOR GRAVITY HOT WATER SYSTEMS**

Based on 2-pipe system with average operating water temperature 170 degrees Fahrenheit, using cast-iron column radiation with heat emission rate 150 Btu per hour square foot equivalent direct radiation.

Square Feet of Installed Equivalent Direct Radiation <sup>1</sup>	Tank Capacity Gallons
Up to 350	18
Up to 450	21
Up to 650	24
Up to 900	30
Up to 1,100	35
Up to 1,400	40
Up to 1,600	2 - 30
Up to 1,800	2 - 30
Up to 2,000	2 - 35
Up to 2,400	2 - 40

<sup>1</sup>For systems with more than 2,400 square feet of installed equivalent direct water radiation, the required capacity of the cushion tank shall be increased on the basis of 1 gallon tank capacity per 33 square feet of additional equivalent direct radiation.

**TABLE 272B**  
**EXPANSION TANK CAPACITIES FOR FORCED HOT WATER SYSTEMS**

Based on average operating water temperature 195 degrees Fahrenheit, a fill pressure 12 psig and maximum operating pressure 30 psig.

<b>System Volume, Gallons<sup>1</sup></b>	<b>Tank Capacity, Gallons</b>
100	15
200	30
300	45
400	60
500	75
1,000	150
2,000	300

<sup>1</sup>Includes volume water in boiler, radiation, and piping, not including expansion tank.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 86, **Eff. Jan. 16, 1976**; 1979 AC.

**R 408.4274 Internal parts subject to deterioration.**

Rule 274. Materials shall not be used for internal parts which are liable to fail due to deterioration when subjected to saturated steam temperatures at or below the maximum allowable working pressure.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4277 Connections for relief valves.**

Rule 277. The area of the opening shall be at least equal to the aggregate area based on the nominal diameters of all of the relief valves with which it connects. A screwed connection may be used for attaching a relief valve.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4278 Relief valves.**

Rule 278. (1) Each hot water heater boiler shall have at least 1 officially rated pressure relief valve set to relieve at or below the maximum allowable working pressure of the boiler.

(2) Each hot water supply boiler shall have at least 1 officially rated safety relief valve or at least 1 officially rated pressure-temperature relief valve of the automatic-reseating type set to relieve at or below the maximum allowable working pressure of the boiler.

(3) When more than 1 relief valve is used on either hot water heating or hot water supply boilers, the additional valve or valves shall be officially rated and may be set within a range not to exceed 6 psi above the maximum allowable working pressure of the boiler up to and including 60 psi and 10% for those having a maximum allowable working pressure exceeding 60 psi.

(4) Relief valves shall be spring loaded without disk guides on the pressure side of the valve.

(5) Relief valves shall be so arranged that they cannot be reset to relieve at a higher pressure than the maximum permitted by this rule.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 56, **Eff. Nov. 14, 1968**; 1979 AC.

**R 408.4280 Lifting devices.**

Rule 280. Each relief valve shall have a substantial device which will positively lift the disk from its seat at least 1/16 inch when there is not pressure on the boiler.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4281 Material of seats and disks of relief valves.**

Rule 281. Seats and disks of relief valves shall be of material suitable to resist corrosion. No materials liable to fail due to deterioration or vulcanization when subject to saturated steam temperature corresponding to capacity test pressure shall be used for any part.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4283 Relief valve size.**

Rule 283. No relief valve shall be smaller than 3/4 inch nor larger than 4 1/2 inches standard pipe size. The inlet opening shall have an inside diameter approximately equal to, or greater than, the seat diameter. In no case shall the minimum opening through any part of the valve be less than 1/4 inch diameter or its equivalent area.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4284 Relieving capacity required.**

Rule 284. (1) The required steam-relieving capacity, in pounds per hour, of the pressure-relieving device or devices on a boiler shall be the greater of that determined by dividing the maximum output in Btu at the boiler nozzle obtained by the firing of any fuel for which the unit is designed by 1,000 or by multiplying the square feet of heating surface by 5. In many cases, a greater relieving capacity of valves will have to be provided than the minimum specified by these rules. In every case, the requirements of subrule (3) shall be met.

(2) When operating conditions are changed, or additional boiler heating surface is installed, the valve capacity shall be increased, if necessary, to meet the new conditions and be in accordance with subrule (3). The additional valves required, on account of changed conditions, may be installed on the outlet piping provided there is an intervening valve.

(3) Relief valve capacity for each boiler shall be such that with the maximum heat input the pressure cannot rise more than 6 psi above the maximum allowable pressure for pressures up to and including 60 psi and 10% for maximum allowable working pressures over 60 psi.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4286 Relief valve connections.**

Rule 286. (1) Relief valves shall be connected to the top of boilers, with the spindle vertical either directly to a tapped or flanged opening in the boiler, to a fitting connected to the boiler by a close nipple, to a Y-base, to a valveless water pipe between adjacent boilers, or to a valveless header connecting water outlets on the same boiler. When a Y-base is used the inlet area shall be not less than the combined outlet areas.

(2) When the size of the boiler requires a relief valve larger than 4 1/2 inches diameter, 2 or more valves having the required capacity shall be used. When 2 or more valves are used on a boiler, they may be single, directly attached, or mounted on a Y-base.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4287 Shutoff valves prohibited.**

Rule 287. No shutoff of any description shall be placed between the relief valve and the boiler, nor on discharge pipes between such valves and the atmosphere. Relief valves shall not be connected to an internal pipe in the boiler.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4288 Area of and support of relief valve discharge pipes.**

Rule 288. (1) When a discharge pipe is used, its area shall be not less than the area of the valves or aggregate area based on the nominal diameters of the valves with which it connects, and the discharge pipe shall be fitted with an open drain to prevent water from lodging in the upper part of the valve or in the pipe. When an elbow is placed on a relief-valve discharge pipe, it shall be located close to the valve outlet. The pipe shall be supported so that no undue stress is placed on the valve body.

(2) The discharge from relief valves shall be arranged so that there will be no danger of scalding attendants.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4290 Marking of safety or relief valves.**

Rule 290. Each safety or relief valve shall be plainly marked by the manufacturer in such a way that the markings will not be obliterated in service. The markings shall be cast or stamped on the valve body or on the lifting lever, providing the lifting lever is permanently attached to the valve, or, when desirable because of size, all or part of the required markings may be stamped, cast or etched on a plate or plates, each securely fastened to the valve body, lever or other permanent part of the valve, and such markings shall include the following:

- (a) The name or identifying trademark of manufacturer.
- (b) Size \_\_\_\_\_ inches.  
(The pipe size of the inlet)
- (c) Pressure \_\_\_\_\_ psi.

(The pressure at which it is set to blow)

- (d) Capacity \_\_\_\_\_ lb. per hour, or  
Capacity \_\_\_\_\_ Btu per hour in accordance with Par. H-51(d)  
ASME code.
- (e) ASME symbol as shown in Fig. H-4 ASME code.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4291 Indirectly heated hot water supply tanks.**

Rule 291. When a hot water supply is heated indirectly by steam in a coil or pipe, the pressure of the steam used shall not exceed the safe working pressure of the hot water tank, and a relief valve of at least 1 inch in diameter, set to relieve at or below the maximum allowable working pressure of the tank, shall be applied on the tank.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4292 Pressure or altitude gauges.**

Rule 292. Each hot water boiler shall have a pressure or altitude gauge connected to it or to its flow connection in such a manner that it cannot be shut off from the boiler except by a cock with tee or level handle, placed on the pipe near the gauge. The handle of the cock shall be parallel to the pipe in which it is located when the cock is open. The scale on the dial of the pressure or altitude gauge shall be graduated to not less than 1 1/2 times the maximum allowable working pressure. The gauge shall be provided with effective stops for the indicating pointer at the zero point and at the maximum pressure point. Pressure or altitude-gauge connections shall be of nonferrous composition when smaller than 1 inch pipe size and longer than 5 feet between the gauge and point of connection of pipe to boiler, and also when smaller than 1/2 inch pipe size and shorter than 5 feet between the gauge and point of connection of pipe to boiler.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4293 Thermometers.**

Rule 293. Each hot water boiler shall have a thermometer so located and connected that it shall be easily readable when observing the water pressure or altitude. The thermometer shall be so located that it shall at all times indicate the temperature in degrees Fahrenheit of the water in the boiler at or near the outlet.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4294 Temperature combustion regulators.**

Rule 294. (1) In addition to the mandatory requirements for a pressure relief device required by R 408.4278, an individual automatically fired hot water heating or hot water supply boiler in addition to the operating control used for normal boiler operation, shall have a separate high-limit-temperature-actuated combustion control that will cut off the fuel supply. The temperature range of a high-limit-actuated combustion control shall not

allow a maximum setting over 250 degrees Fahrenheit and shall control the rate of combustion to prevent the temperature of the water from rising above 250 degrees Fahrenheit at or near the boiler outlet. Separate controls may have a common connection to the boiler.

(2) When it is known that the Btu input to a hot water supply boiler does not exceed 200,000 or the volume does not exceed 120 gallons, the maximum setting of the high-limit control determines whether the hot water supply boiler is subject to these rules. The settings at which stops are inserted can be considered to be the determining factor if the setting is with metallic fixed stops.

History: 1954 ACS 49, Eff. Feb. 14, 1967; 1954 ACS 56, **Eff. Nov. 14, 1968**; 1979 AC.

**R 408.4296 Bottom blowoffs or drain valves.**

Rule 296. (1) Each boiler shall have a bottom blowoff or drain pipe connection fitted with a valve or cock connected with the lowest water space practicable, with the minimum size of blowoff piping and valves as shown in table 296.

Table 296  
Sizing of Bottom Blowoff Piping and Valves

Minimum Required Safety or Relief Valve Capacity lb. of Steam per Hour	Blowoff Valves Size, Inches
Up to 500	3/4
501 to 1,250	1
1, 251 to 2,500	1 1/4
2,501 to 6,000	1 1/2
6, 001 and larger	2

To determine the discharge capacity of relief valves in terms of Btu, the relieving capacity in pounds of steam per hour is multiplied by 1,000.

(2) Any discharge piping connected to bottom blowoff and/or bottom drain connection shall be full size to the point of discharge.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

**R 408.4298 Jacketed boilers.**

Rule 298. Any or all of the fittings and appliances required by these rules may be installed inside of boiler jackets provided the water gauge and pressure gauge on a thermometer and pressure gauge on a water boiler are visible through an opening or openings at all times.

History: 1954 ACS 49, **Eff. Feb. 14, 1967**; 1979 AC.

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