



Rules of
Department of Public Safety
Division 40—Division of Fire Safety
Chapter 2—Boiler and Pressure Vessel Safety Rules

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**Title 11—DEPARTMENT OF
PUBLIC SAFETY**

**Division 40—Division of Fire Safety
Chapter 2—Boiler and Pressure Vessel
Safety Rules**

11 CSR 40-2.010 Definitions

PURPOSE: This rule formulates definitions concerning boilers, water heaters, and pressure vessels in Missouri.

(1) Act—The Boiler and Pressure Vessel Safety Act which was enacted as sections 650.200–650.295, RSMo.

(2) ASME Code—*The American Society of Mechanical Engineers International (ASME) Boiler and Pressure Vessel Code*, including Code Cases and interpretations as made, approved, and adopted by the Council of the Society and approved and adopted by the board. Copies of the code may be obtained from the ASME at Three Park Ave., New York, NY 10016-5990.

(3) Alteration—Any change in the item described on the original manufacturer's data report which affects the pressure containing capability of the pressure retaining item. Non-physical changes such as an increase in the maximum allowable working pressure (internal or external), increase in design pressure, or a reduction in minimum temperature of a pressure retaining item.

(4) API Code—The edition and addenda of ANSI/API Std-510 as published by the American Petroleum Institute and adopted by the board.

(5) Approved—Approved by the Board of Boiler and Pressure Vessel Rules.

(6) Board—The Board of Boiler and Pressure Vessel Rules created by the Act and empowered to interpret the Act and to make, alter, amend, and interpret the rules for the safe construction, installation, inspection, alteration, and repair of boilers and pressure vessels.

(7) Boiler—A pressurized vessel in which water is heated, steam is generated, steam is superheated, or any combination of these, under pressure or vacuum by the direct application of heat. The term boiler includes fired units for heating or vaporizing liquids other than water where these units are separate from processing systems and complete within themselves.

(8) Certificate of competency—A certificate issued to a person who has passed the examination(s) and met the experience requirements prescribed.

(9) Certificate inspection—An inspection, the report of which is used by the chief inspector as justification for issuing, withholding, or suspending the Inspection Certificate.

(A) Internal inspection—As complete an examination as can reasonably be made of the internal areas, including the wetted surfaces, and external surfaces of a boiler or pressure vessel while it is not in operation.

(B) External inspection—An inspection performed on the external surfaces of a boiler or pressure vessel including all fittings and appliances.

(10) Chief inspector—The chief boiler and pressure vessel inspector appointed by the director under the provisions of this Act.

(11) CSD-1—Standard for Control and Safety Devices for Automatically Fired Boilers published by the American Society for Mechanical Engineers (ASME).

(12) Deputy inspector—Any inspector appointed and employed by the director under the provisions of this Act.

(13) Director—The state fire marshal or appointed designee.

(14) Emergency installation—The unplanned replacement of a boiler, water heater, pool heater, or pressure vessel due to failure.

(15) Existing installation—Includes any boiler, water heater, or pressure vessel constructed, installed, placed in operation, or under contract on or before November 12, 1986.

(16) Fittings and appliances—Include but not limited to pressure relief devices, low water protection, pressure controls, temperature controls, thermometers, gages, expansion tanks, pipe, pipe fittings, pipe valves, etc., within the scope of the Act and these rules.

(17) Hobby boiler—A boiler operated as a personal hobby and not used for commercial gain.

(18) Hot water heating boiler—A boiler in which no steam is generated, from which hot water is circulated for heating purposes and then returned to the boiler, and which operates at a pressure not exceeding one hundred sixty (160) pounds per square inch (psi) and/or a temperature of two hundred fifty degrees

Fahrenheit (250 °F) at or near the boiler outlet.

(19) Hot water supply boiler—A boiler completely filled with water that furnishes hot water to be used externally to itself at pressures not exceeding one hundred sixty (160) psi or at temperatures not exceeding two hundred fifty degrees Fahrenheit (250 °F) at or near the boiler outlet.

(20) Inspection certificate—A certificate issued by the chief inspector for the operation of a boiler, water heater, or pressure vessel as required by the Act and these rules.

(21) Inspector—The chief inspector, deputy inspector, special inspector, or owner-user inspector authorized to perform certificate inspections in Missouri.

(22) Installation site—The physical location where one (1) or more boilers, water heaters, pressure vessels, or a combination thereof are located. Examples of installation sites include but are not limited to a single boiler room in a building, a single process building, a single laboratory building, or a central utility building.

(23) Installer—The organization responsible for the installation of a boiler, water heater, or pressure vessel, including any associated control systems and protective equipment.

(24) *International Mechanical Code*—International Code Council, Inc.

(25) Fired jacketed steam kettle—A gas-fired or electrically heated kettle with jacket(s), operating at pressure not exceeding fifty (50) psi.

(26) Labeled—Equipment or materials to which the label of a nationally recognized testing agency, such as Underwriters Laboratory (UL) or Factory Mutual (FM), has been applied. Application of the label indicates compliance with the agency's standards.

(27) Listed—Equipment or materials which are included on a list published by a nationally recognized testing agency, such as Underwriters Laboratory (UL) or Factory Mutual (FM). Listing indicates compliance with nationally recognized standards.

(28) MAWP—Maximum allowable working pressure.



(29) National Board (NB)—The National Board of Boiler and Pressure Vessel Inspectors.

(30) National Board Commission—The commission issued to an inspector by the National Board of Boiler and Pressure Vessel Inspectors.

(31) National Board Inspection Code (NBIC)—The edition and addenda of ANSI/NB-23 currently adopted by the board.

(32) New installation—Includes all boilers, water heaters, or pressure vessels constructed, installed, placed in operation, or under contract on or after November 12, 1986.

(33) Nonstandard boiler, water heater, or pressure vessel—A boiler, water heater, or pressure vessel that does not bear the ASME stamp.

(34) Object—A boiler, water heater, or pressure vessel.

(35) Owner or user—Any person, firm, or corporation legally responsible for the safe installation, operation, and maintenance of any boiler, water heater, or pressure vessel within the state of Missouri.

(36) Plans—Drawings, specifications, schematics, etc., acceptable to the chief inspector and suitable for determining if the installation meets the requirements of the statute and these rules.

(37) Pool heater—An appliance designed for heating non-potable water stored at atmospheric pressure, such as water in swimming pools, spas, hot tubs, and similar applications.

(38) Power boiler—A boiler in which steam or other vapor is generated at a pressure of more than fifteen (15) psi for use external to itself or a water (or other liquid) boiler intended for operation at pressures in excess of one hundred sixty (160) psi and/or temperatures in excess of two hundred fifty degrees Fahrenheit (250 °F).

(39) Pressure vessel—A vessel in which the pressure is obtained from an external source or by the application of heat from an indirect source, other than those vessels defined as boilers.

(40) Reinstalled boiler, water heater, or pressure vessel—A boiler, water heater, or pressure vessel removed from its original setting

and reinstalled at the same location or at a new location without change of ownership.

(41) Repair—The process of restoring a component or system to a safe and satisfactory condition such that the existing design conditions are met.

(42) Replacement—The removal of an existing boiler, water heater, or pressure vessel and installation of a new second-hand or re-installed boiler, water heater, or pressure vessel.

(43) Second-hand boiler, water heater, or pressure vessel—A boiler, water heater, or pressure vessel which has changed both location and ownership.

(44) Special inspector—Any inspector commissioned by the chief inspector who is employed by an insurance company authorized to provide boiler and pressure vessel insurance in this state or an inspector who is employed by a company that maintains an inspection department whose organization and inspection procedures meet the requirements of the National Board for an Owner-User Inspection Agency and are acceptable to the chief inspector.

(45) Standard boiler, water heater, or pressure vessel—A boiler, water heater, or pressure vessel that bears the ASME stamp.

(46) State special—A boiler, water heater, or pressure vessel of special construction, or which is designed or constructed to other than the ASME Code and is not inconsistent with the spirit and safety objectives of the ASME Code.

(47) Steam heating boiler—A steam or vapor boiler operating at pressures not exceeding fifteen (15) psi.

(48) Waste heat boiler—A boiler that has, as its principal source of thermal energy, a hot gas stream from the exhaust of a gas turbine or internal combustion engine.

(49) Water heater—A fired, pressurized vessel in which water is heated by electricity, or by the combustion of solid, liquid, or gaseous fuels and withdrawn for use external to the heater at pressures not exceeding one hundred sixty (160) psi and temperatures not exceeding two hundred ten degrees Fahrenheit (210 °F). Water heaters include service water heaters, domestic water heaters, potable water heaters, and car wash hot water supply boilers. The term “water heater” does

not include vessels used solely for closed loop hot water heating service.

(50) Variance—An exception to the Act or these rules authorized by the board for the installation, inspection, repair, or alteration of a boiler, water heater, or pressure vessel.

AUTHORITY: section 650.215, RSMo 2000. Original rule filed May 12, 1986, effective Oct. 27, 1986. Amended: Filed Oct. 3, 1995, effective April 30, 1996. Rescinded: Filed March 10, 2003, effective Aug. 30, 2003. Readopted: Filed Sept. 25, 2002, effective May 30, 2003. Amended: Filed Jan. 12, 2006, effective June 30, 2006. Amended: Filed March 23, 2006, effective Dec. 30, 2006. Amended: Filed June 30, 2009, effective Feb. 28, 2010.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.*

11 CSR 40-2.015 Code/Standards Adopted by Board

PURPOSE: This rule identifies the codes/standards applicable and adopted by the board.

PUBLISHER’S NOTE: The secretary of state has determined that the publication of the entire text of the material which is incorporated by reference as a portion of this rule would be unduly cumbersome or expensive. This material as incorporated by reference in this rule shall be maintained by the agency at its headquarters and shall be made available to the public for inspection and copying at no more than the actual cost of reproduction. This note applies only to the reference material. The entire text of the rule is printed here.

(1) *ASME Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers is hereby incorporated by reference in this rule. ASME Boiler and Pressure Vessel Code is published by the American Society of Mechanical Engineers. A copy of this code can be obtained from The American Society of Mechanical Engineers, Three Park Ave, New York, NY 10015-5990 or Internet: www.asme.org, Phone: 1 (800) 843-2763. This regulation does not include any later amendments or additions to the ASME Boiler and Pressure Vessel Code:*

(A) *2019 ASME Boiler and Pressure Vessel Code; and*

(B) *Sections III and XI are exempt from state regulation.*

(2) *National Board Inspection Code*



(ANSI/nb23) is hereby incorporated by reference in this rule. The *National Board Inspection Code* is published by The National Board. A copy of this code may be obtained from The National Board, 1055 Crupper Ave., Columbus, OH 43229-1183 or Internet: www.nationalboard.org, Phone: (614) 888-8320. This regulation does not include any later amendments or additions to the *National Board Inspection Code*. NB-23—*Manual for Boiler and Pressure Vessel Inspectors*:

(A) 2019 Edition; Parts 1, 2, and 3, with Part 2 being permissive.

(3) ASME Code for Power Piping, B31.1 of the American Society of Mechanical Engineers. *ASME Boiler and Pressure Vessel Code* is hereby incorporated by reference in this rule. It is published by the American Society of Mechanical Engineers. A copy of this code can be obtained from The American Society of Mechanical Engineers, Three Park Ave., New York, NY 10015-5990 or Internet: www.asme.org, Phone: 1 (800) 843-2763. This regulation does not include any later amendments or additions to the *ASME Boiler and Pressure Vessel Code*.

(A) 2018 Edition.

(B) Adopted for Boiler Proper and Boiler External Piping only; requirements for Non-Boiler External Piping and Joint (NBEP) as defined in B31.1, 2018 Edition are permissive.

(4) *Code for Controls and Safety Devices for Automatically Fired Boilers* CSD-1-2018 Edition of the American Society of Mechanical Engineers. The *Code for Controls and Safety Devices for Automatically Fired Boilers* CSD-1-2018 edition is hereby incorporated by reference in this rule. It is published by the American Society of Mechanical Engineers. A copy of this code may be obtained from The American Society of Mechanical Engineers, Three Park Ave., New York, NY 10015-5990 or Internet: www.asme.org, Phone: 1 (800) 843-2763. This regulation does not include any later amendments or additions to the *Code for Controls and Safety Devices for Automatically Fired Boilers* CSD-1-2018.

(A) With part CM being permissive.

(5) NFPA 85, *Boiler and Combustion Systems Hazards Code*, 2019 Edition. The *Boiler and Combustion Systems Hazards Code* NFPA 85, 2019 Edition is hereby incorporated by reference in this rule. It is published by the National Fire Protection Agency. A copy of this code may be obtained from National Fire Protection Agency, 1 Batterymarch Park, Quincy, MA 02169-7471, Internet: www.nfpa.org, Phone: 1 (617) 770-3000. This regulation does not include any later amendments or additions to the *Boiler and*

Combustion Systems Hazards Code NFPA 85, 2019 Edition.

(6) NFPA 54, *National Fuel Gas Code* (ANSI Z221.1-2006), 2018 Edition. The *National Fuel Gas Code* NFPA 54, 2015 Edition is hereby incorporated by reference in this rule. It is published by the National Fire Protection Agency. A copy of this code may be obtained from National Fire Protection Agency, 1 Batterymarch Park, Quincy, MA 02169-7471, Internet: www.nfpa.org, Phone: 1 (617) 770-3000. This regulation does not include any later amendments or additions to the *National Fuel Gas Code* NFPA 54, 2018 Edition.

(7) *Pressure Vessel Inspection Code, API-510 of the American Petroleum Institute*, 2014 Edition is hereby incorporated by reference in this rule. The *American Petroleum Institute 510* is published by the American Petroleum Institute. A copy of this code may be obtained from The American Petroleum Institute, 1220 L Street NW, Washington, DC 20005-4070, Internet: <http://api-ec.api.org/front-page.cfm>, Phone: (202) 682-8000. This regulation does not include any later amendments or additions to the *American Petroleum Institute 510*.

(8) *American National Standard/CSA Standard For Gas-Fired Pool Heaters* (ANSI Z21.56-2006/CSA 4.7-2013) is hereby incorporated by reference in this rule. A copy of this standard may be obtained from CSA America, 8501 East Pleasant Valley Road, Cleveland, OH 44131-5575, Internet: www.csa-america.org, Phone: (216) 524-4990. This regulation does not include any later amendments or additions to the *Standard for Gas-Fired Pool Heaters*, 2013 Edition.

(9) American National Standard/CSA *Standard for Gas Water Heaters* (ANSI Z21.10.3-2015/CSA 4.3-2015) is hereby incorporated by reference in this rule. A copy of this standard may be obtained from CSA America, 8501 East Pleasant Valley Road, Cleveland, OH 44131-5575, Internet: www.csa-america.org, Phone: (216) 524-4990. This regulation does not include any later amendments or additions to the *Standard for Gas Water Heaters*, 2015 Edition.

(10) NFPA 31-*Standard for Installation of Oil-Burning Equipment*, 2016 Edition is hereby incorporated by reference in this rule. The *Standard for Installation of Oil-Burning Equipment* is published by the National Fire Protection Agency. A copy of this code may be obtained from National Fire Protection Agency, 1 Batterymarch Park, Quincy, MA 02169-7471, Internet: www.nfpa.org, Phone: (617) 770-3000. This regulation does not

include any later amendments or additions to the *Standard for Installation of Oil-Burning Equipment*, 2016 Edition.

(11) ASME PVHO-1-2016, *Safety Standard for Pressure Vessels for Human Occupancy* is hereby incorporated by reference in this rule. A copy of this code can be obtained from The American Society of Mechanical Engineers, Three Park Ave., New York, NY 10015-5990 or Internet: www.asme.org, Phone: 1 (800) 843-2763. This regulation does not include any later amendments or additions to the *ASME Safety Standard for Pressure Vessels for Human Occupancy*, 2016 Edition.

(12) NFPA 57—*Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code*, 2002 Edition is hereby incorporated by reference in this rule. The *Liquefied Natural Gas Vehicular Fuel Systems Code* is published by the National Fire Protection Agency. A copy of this standard may be obtained from NFPA, 1 Batterymarch Park, Quincy, Massachusetts 02169. This regulation does not include any later amendments or additions to the *Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code*, 2002 Edition.

AUTHORITY: section 650.215, RSMo 2016. Original rule filed Sept. 25, 2002, effective May 30, 2003. Amended: Filed Jan. 12, 2006, effective June 30, 2006. Amended: Filed June 30, 2009, effective Feb. 28, 2010. Amended: Filed Oct. 16, 2019, effective April 30, 2020.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.*

11 CSR 40-2.020 Administration (Rescinded August 30, 2003)

AUTHORITY: section 650.215, RSMo 1998. Original rule filed May 12, 1986, effective Oct. 27, 1986. Amended: Filed Dec. 1, 1987, effective Feb. 11, 1988. Amended: Filed Sept. 27, 1990, effective Feb. 14, 1991. Amended: Filed Oct. 3, 1995, effective April 30, 1996. Amended: Filed March 15, 1999, effective Sept. 30, 1999. Rescinded: Filed March 10, 2003, effective Aug. 30, 2003.

11 CSR 40-2.021 Inspector/Qualifications/Examinations/Responsibilities

PURPOSE: This rule addresses the qualifications and responsibilities of boiler, water heater and pressure vessel inspectors.

(1) As used in this rule, the term “these rules” is intended to mean 11 CSR 40-2.010



through 11 CSR 40-2.065.

(2) Identification Card Issued by Chief Inspector.

(A) Each deputy and special inspector engaged in the inspection of boilers, water heaters or pressure vessels shall obtain an identification card prior to performing any inspection.

(B) An identification card is valid until December 31 of the year in which it is issued and must be renewed annually. Requests for renewal shall be submitted in writing to the chief inspector prior to the expiration date.

(C) An initial identification card may be obtained from the chief inspector after passing the required examination(s) and payment of fees. An examination is not required for renewal.

(D) Each applicant for an initial identification card shall submit a written application and the required fee to the chief inspector at least thirty (30) days prior to the next scheduled examination, on forms furnished by the chief inspector, stating the applicant's education and work experience, including the names of current and previous employers, length of time employed by each employer and position held. The applicant shall also submit a copy of a photo identification card from the employer or a copy of a valid photo identification driver's license and a copy of the applicant's most recent national board commission.

(E) An applicant shall have education and experience equal to at least one (1) of the following:

1. A degree in mechanical engineering plus one (1) year of experience in design, construction, operation or inspection of boilers or pressure vessels; or

2. A degree in a branch of engineering, other than mechanical engineering or an associates degree in mechanical technology plus two (2) years of experience in design, construction, operation or inspection of boiler or pressure vessels; or

3. The equivalent of a high school education plus three (3) years of experience—

A. In boiler or pressure vessel construction or repair; or

B. As an operating engineer in charge of high pressure boiler operation; or

C. As an inspector of boilers or pressure vessels; or

4. A valid commission from the national board.

(F) Applicants whose education and work experience are acceptable to the chief inspector will be permitted to take a two (2)-part written examination. Part 1 of the examination will test the applicant's knowledge of the

ASME Code. Part 2 of the examination will test the applicant's knowledge of the Missouri Boiler and Pressure Vessel Act (Act) and these rules. An applicant must pass both parts of the examination. Part 1 of the examination may be waived by the chief inspector for those applicants who have a valid national board commission.

(G) Upon completing the requirements of this rule and payment of the required fees, an identification card will be issued.

(H) An identification card shall be invalid when the inspector to whom it was issued is no longer employed by the organization shown on the identification card. Within thirty (30) days of termination of employment, the inspector shall return their identification card to the chief inspector. A new identification card will not be issued until the previous identification card is returned.

(I) After due investigation, an identification card may be suspended for cause by the chief inspector at the recommendation of the board. Cause for suspension may include but is not limited to neglect of duty, untrustworthiness, conflict of interest, or willful falsification of information on a report of inspection or an application for an identification card. Falsification of information on a report may include, but is not limited to the omission of material information that would affect the issuance or non-issuance of an inspection certificate.

(3) Inspector's Responsibilities.

(A) The inspector is responsible for:

1. Performing a complete and thorough inspection of each object in accordance with the Act and these rules;

2. Submitting inspection reports in accordance with the requirements of these rules and reporting any condition that is not in accordance with the Act or these rules;

3. Notifying the chief inspector of a boiler, water heater, or pressure vessel failure or of an injury or fatality involving a boiler, water heater, or pressure vessel incident in a timely manner; and

4. Advising owner/users of the requirements of the Act and these rules;

(B) The inspector shall not receive reimbursement for operating or servicing any boiler, water heater or pressure vessel in Missouri or engaging in:

1. The sale, manufacture or repair of any boiler, water heater or pressure vessel; or

2. The sale of any chemical, service, article or device relating to boilers, water heaters or pressure vessels or their appurtenances.

AUTHORITY: section 650.215, RSMo 2000. *

Original rule filed Sept. 25, 2002, effective May 30, 2003.

*Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.

11 CSR 40-2.022 Certificates, Inspections and Fees

PURPOSE: This rule addresses the tagging, frequency of inspection, inspection reports, and fees for inspection of objects that are included in the Boiler and Pressure Vessel Safety Act (Act) and these rules.

(1) As used in this rule, the term "these rules" is intended to mean 11 CSR 40-2.010 through 11 CSR 40-2.065.

(2) Initial Inspection and Tagging an Object.

(A) Upon completion of the installation of a boiler, water heater, pool heater, or pressure vessel, or at the time of the initial certificate inspection, each object shall be stamped or tagged with a unique serial number issued by the state. The stamping will consist of letters and figures to be not less than five-sixteenths inch (5/16") in height and arranged as follows:

MO 123456

Alternatively, a metal tag issued by the chief inspector may be securely affixed using screws, rivets, wire, or other means so that the tag cannot be easily removed. The "MO" number or metal tag (not less than one inch by four inches (1" x 4") in size) shall have the serial number of the state stamped on it and may not be transferred to any other object. The tag or stamping shall be readily visible and placed as close to the ASME nameplate as practical. The tag shall preferably be attached directly to the object.

(B) It is the responsibility of the special inspector and the owner, to report untagged boilers, water heaters, and pressure vessels that fall under this Act and these rules, to the chief inspector.

(C) When an object is inactivated or scrapped, the tag shall be bent in half and shall remain with the object. The inspector shall submit an inspection report to the chief inspector indicating the new status.

(3) Frequency of Inspection of Power Boilers.

(A) Power boilers shall receive a certificate inspection annually, which shall be an internal inspection where construction permits; otherwise it shall be as complete an inspection as possible while the boiler is in operation. Boilers shall also be annually inspected



externally while under normal operating conditions.

(B) Coil-type steam generators that do not have inspection openings, hot liquid (other than water) boilers, and waste heat boilers (with welded closure heads) need not be internally inspected. However, they shall be annually inspected externally while in operation. The inspector may mandate an internal inspection if the inspector feels it is necessary.

(C) Any single power boiler used to generate more than four hundred thousand pounds per hour (400,000 lbs/hr) is required to be internally inspected every two (2) years provided the following is verified by the inspector annually and reported to the chief inspector:

1. Full-time operators attend the boiler;
2. Chemical water analysis is monitored and documented at least weekly by a competent individual when the boiler is in operation and at least quarterly if the boiler is not in operation;

3. All welding of pressure parts and welding to pressure parts shall be in accordance with the *National Board Inspection Code* (NBIC) and these rules;

4. An inspector shall perform an external inspection, annually, while the boiler is in operation. A report of all inspections must be submitted to the chief inspector. All inspections shall verify compliance with subsection (3)(C) of this rule.

(4) Frequency of inspection of heating boilers, water heaters, pool heaters, and fired jacketed steam kettles.

(A) Steam heating boilers shall be inspected every two (2) years. The certificate inspection shall be an internal inspection where construction permits; otherwise the inspection shall be as complete as possible while the boiler is in operation.

(B) Hot water heating boilers and fired jacketed steam kettles shall be inspected every two (2) years.

1. Hot water heating and hot water supply boilers over thirty (30) years old shall be internally inspected every two (2) years where construction permits, otherwise the inspection shall be as complete as possible while the boiler is in operation.

2. Hot water heating and hot water supply boilers that are not over thirty (30) years old shall be externally inspected every two (2) years. The inspector may mandate an internal inspection if the inspector feels it is necessary.

3. Water heaters, pool heaters, and fired jacketed steam kettles shall be externally inspected every two (2) years.

(C) Exemptions from Internal Inspections.

1. Coil-type steam generators that do not have inspection openings, hot liquid (other than water) boilers, and waste heat boilers (with welded closure heads) need not be internally inspected. However, they shall be biennially inspected externally while in operation. The inspector may mandate an internal inspection if the inspector feels it is necessary.

(5) Frequency of Inspection of Pressure Vessels.

(A) Pressure vessels shall receive a certificate inspection every two (2) years. This inspection shall be an external inspection. The inspector may mandate an internal inspection if the inspector feels it is necessary.

(6) Variations in Inspection Frequency.

(A) Based upon documentation of actual service conditions, the chief inspector, at his discretion, may permit variations in the inspection frequency requirements as provided in the Act and these rules.

(7) Access and Scheduling of Inspections.

(A) The owner or user of a boiler, water heater, or pressure vessel shall provide the inspector access, during reasonable working hours, to perform a certificate inspection or to determine whether a boiler, water heater, or pressure vessel subject to inspection under the statute exists at the location. Boilers, water heaters, and pressure vessels that are subject to inspection and have not been previously inspected shall be inspected immediately or at a time mutually agreeable to the owner and the inspector, within twenty (20) working days.

(B) The inspector shall make every effort to perform the certificate inspection prior to the expiration date of the certificate. When this is not possible, the inspector has a thirty (30)-calendar day grace period past the expiration date in which to perform the inspection. Inspection reports shall be submitted to the chief inspector within thirty (30)-calendar days of the inspection.

(C) External inspections may be performed by the inspector without prior notification to the owner or user. The inspector may require additional tests or inspections including an internal inspection when, in the inspector's judgment, continued operation of the boiler, water heater, or pressure vessel constitutes a menace to public safety. The owner or user, at his expense, shall prepare the boiler, water heater, or pressure vessel for the inspections or tests required by the inspector.

(D) Internal inspections shall be scheduled at a time mutually agreeable to the inspector and the owner or user. The owner or user shall bear all inspection preparation and restoration cost associated with inspection.

(8) Preparation for Inspection. The owner or user shall prepare each boiler, water heater, and pressure vessel for inspection.

(A) Preparation for internal inspection shall be as follows:

1. Water shall be drawn off and the boiler washed thoroughly;

2. Manhole and handhole plates, washout plugs, and inspection plugs in water column connections shall be removed as required by the inspector. The furnace and combustion chambers shall be cooled and thoroughly cleaned;

3. All grades of internally fired boilers shall be removed as required by the inspector;

4. Insulation or brickwork shall be removed or opened as required by the inspector to determine the condition of the boiler, headers, furnace, supports, or other parts;

5. Burners shall be removed, if necessary, to inspect the external firebox areas;

6. The pressure gage shall be removed for testing if required by the inspector;

7. All low water fuel cut off devices shall be removed from the boiler or disassembled to the satisfaction of the inspector;

8. Any leakage of steam or hot water into the boiler shall be prevented by disconnecting the pipe or valve at the most convenient point or any other appropriate means approved by the inspector;

9. Before opening the manhole or handhole covers and entering any part of the steam generating unit connected to a common header with other boilers, the nonreturn and steam stop valves must be closed, tagged, and padlocked. The drain valves or cocks between the two (2) steam valves shall be opened. The feed valves must be closed, tagged, and padlocked and drain valves or cocks located between the two (2) valves opened. After draining the boiler, the blow off valves shall be closed, tagged, and padlocked. Blow off lines, where practicable, shall be disconnected between pressure parts and valves. All drains and vent lines shall be opened;

10. Steam drums shall have all trays and other attachments removed to the extent required by the inspector.

(B) Preparation for external inspection shall be as required by the inspector.

(C) If a boiler, water heater, or pressure vessel has not been properly prepared for an internal inspection, the inspector may decline to make the inspection. The inspection certificate shall be voided or not renewed until



the owner or user complies with the requirements. The owner or user shall provide at least twenty-four (24)-hour notice if it is necessary to cancel a prearranged internal inspection with a deputy inspector or the chief inspector. Failure to provide such notice or failure to properly prepare the boiler, water heater, or pressure vessel for inspection may result in the assessment of an hourly fee for travel time plus expenses and mileage in addition to the inspection fee and inspection certificate fee as listed in this rule.

(D) Removal of Covering to Permit Inspection. Sufficient jacketing or other form of casing or housing shall be removed to permit reasonable inspection of the object.

(E) If additional tests are required by the inspector, such tests shall be scheduled by the owner or user at the owner or user's expense. Pressure test shall not exceed the maximum allowable working pressure (MAWP) unless acceptable to the owner or user, and the inspector.

(9) Inspection Reports.

(A) Inspectors shall submit to the chief inspector an inspection report on the Missouri Boiler and Pressure Vessel website or by electronic interface in a format acceptable to the board for each boiler, water heater, pool heater, and pressure vessel subject to inspection in this state. Complete data and calculations that may be required by these rules shall be submitted for each nonstandard boiler, water heater, or pressure vessel when it is first tagged or stamped with a state number.

(B) Inspection reports shall be submitted within thirty (30)-calendar days from the date of inspection.

(10) Insurance Companies to Notify Chief Inspector of New, Cancelled, or Suspended Insurance on Boilers, Water Heaters, or Pressure Vessels.

(A) All insurance companies shall notify the chief inspector, within thirty (30) calendar days of all boilers, water heaters, or pressure vessels on which insurance is written, cancelled, or not renewed. When an insurance company suspends coverage due to an unsafe condition, the chief inspector shall be notified within seven (7)-calendar days. All notices shall reference each object by the Missouri identification number.

(11) Owner or User to Notify Chief Inspector of Accident.

(A) When an accident occurs to a boiler, water heater, or pressure vessel, the owner or user shall promptly notify the chief inspector by submitting a detailed report of the accident. In the event of an injury, fatality, or any

explosion, notice shall be given immediately to the chief inspector.

(12) Validity of Inspection Certificate.

(A) An inspection certificate shall be valid until expiration unless some defect or condition affecting the safety of the boiler, water heater, or pressure vessel is disclosed or the installation is altered to make it in noncompliance with the Act or these rules. The inspection certificate expires when a boiler, water heater, or pressure vessel is moved to another location or is reinstalled.

(13) Issuance of Certificates.

(A) Upon completion of a satisfactory inspection, an inspection certificate shall be issued for each boiler, water heater, or pressure vessel conforming to these rules following payment of the required fees by the owner or user. When conflict exists between the owner and user concerning the repairs or payment of fees for any object, the owner is ultimately responsible for the payment of fees and/or repairs. Payment shall be made payable to the Division of Fire Safety.

(14) Fee Schedule.

(A) Inspections by the chief inspector or deputy inspector shall be paid in accordance with the fee schedule below. These inspection fees are in addition to the inspection certificate fee.

- 1. Power Boilers:
 - A. Internal inspections—
 - 4,000 lbs/hr capacity or less \$35
 - Over 4,000 lbs/hr up to 16,000 lbs/hr \$60
 - 16,000 lbs/hr or greater Hourly Rate
 - B. External Inspections—
 - 4,000 lbs/hr capacity or less \$25
 - Over 4,000 lbs/hr \$35
- 2. Heating Boilers, Water Heaters, Pool Heaters, and Fired Vessels:
 - A. Internal inspections—
 - 4,000 lbs/hr capacity or less \$35
 - Greater than 4,000 lbs/hr \$45
 - B. External inspections—
 - Hot water heating boilers, hot water supply boilers, pool heaters, circulating water heaters, and steam heating boilers less than or equal to 15 psi \$25
 - Fired storage water heaters and fired jacketed steam kettles \$18
- 3. Pressure Vessels:
 - A. 1,000 cu. ft. (7,500 gal.) or less in volume \$16
 - B. Over 1,000 cu. ft. (7,500 gal.) in volume \$25
 - C. Internal inspection requiring entry Hourly Rate

D. No more than one hundred twenty dollars (\$120) shall be charged for any one (1) pressure vessel, except inspection under subparagraph (14)(A)3.C., in any one (1) year for a routine certificate inspection.

(B) Miscellaneous Fees.

- 1. Examination Fees \$50
- 2. Commissions
 - A. New issuance \$50
 - B. Renewal (commission previous year) \$25
- 3. Inspection certificate \$20
- 4. Change of certificate name \$15
- 5. Accreditation reviews—ASME and National Board \$1,000 plus expenses
- 6. Hourly Rates:
 - A. Each hour or part thereof up to eight hours \$35
 - B. Each hour or part thereof over eight hours in any one day \$50
- 7. Reinspection fee for improperly prepared object Hourly Rate plus expenses

(15) Refusal to Permit Inspection or Pay Fees.

(A) If the owner or user of a boiler, water heater, or pressure vessel refuses to allow an inspection to be made, or refuses to pay the fee stipulated, a new inspection certificate shall not be issued.

(16) Posting of Inspection Certificate.

(A) It is the owner or user's responsibility to assure a valid inspection certificate is posted at the location of the object.

(17) Operation Without a Valid Inspection Certificate.

(A) The owner or user who causes or permits operation of a boiler or pressure vessel without a valid inspection certificate shall be subject to the penalties as provided for in the Act.

AUTHORITY: section 650.215, RSMo 2000. Original rule filed Sept. 25, 2002, effective May 30, 2003. Amended: Filed June 30, 2009, effective Feb. 28, 2010.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.*

11 CSR 40-2.025 Installation Permits

PURPOSE: This rule addresses the application requirement, issuing of permits and installation inspections for the repair, replacement or new installation of objects that are subject to the Act and these rules.



(1) As used in this rule, the term “these rules” is intended to mean 11 CSR 40-2.010 through 11 CSR 40-2.065.

(2) Effective January 1, 2007 an installation permit shall be obtained by the installer from the Division of Fire Safety, Boiler and Pressure Vessel Unit before the start of work for each new, second hand or reinstalled boiler, water heater or pressure vessel. Replacement or relocation of an existing boiler, water heater or pressure vessel shall be permitted as a new installation. The requirement to obtain an installation permit prior to the start of work is waived for an emergency replacement upon notification to the chief inspector.

(3) An application for an installation permit shall be submitted to the chief inspector on forms provided by the Division of Fire Safety, Boiler and Pressure Vessel Unit at least sixty (60) days prior to the start of the installation.

(A) In the case of an emergency replacement, the application shall be submitted to the chief inspector as soon as possible but not more than seven (7) calendar days after the work has started.

(B) Installation permits for multiple boilers, water heaters or pressure vessels may be requested on a single application provided they are all located at the same installation site. In such cases separate installation permits will be issued and fees will be charged for each permit.

(C) Upon review of the installation permit, the chief inspector may require a plan review prior to issuing an installation permit. A separate fee of thirty-five dollars (\$35) per hour not to exceed five hundred dollars (\$500) total will be charged for the plan review.

(D) Upon completion of the review process and payment of the required fees an installation permit will be issued. The installer shall maintain a legible copy of the installation permit at the installation site.

(4) Fees.

- (A) Plan Review Hourly Fee \$ 35
- (B) Installation Permit Fees—
 - 1. Hot Water Heating Boiler—
 - A. 400,000 BTUH and less \$ 70
 - B. Greater than 400,000 BTUH but less than 12,500,000 BTUH \$175
 - C. 12,500,000 BTUH and above \$245
 - 2. Hot Water Supply Boilers, Circulating Water Heaters, and Pool Heaters—
 - A. 400,000 BTUH and less \$ 70
 - B. Greater than 400,000 BTUH

- but less than 12,500,000 BTUH \$175
- C. 12,500,000 BTUH and above \$245
- 3. Fired Jacketed Steam Kettles \$ 70
- 4. Power Boilers—
 - A. 400,000 BTUH and less \$ 70
 - B. Greater than 400,000 BTUH but less than 12,500,000 BTUH \$175
 - C. 12,500,000 BTUH and above \$245
- 5. Pressure Vessel—
 - A. 1,000 cu.ft. (7,500 gallons) or less \$ 70
 - B. Greater than 1,000 cu. ft. \$175
 - C. Compressed air receivers including tank mounted air compressors designed to operate at 250 psi or less and having a volume of 250 gallons or less \$ 25
 - D. Carbon Dioxide Storage Vessels used solely for carbonated beverage systems \$ 25
- 6. Steam Heating Boilers—
 - A. 400,000 BTUH or less \$ 70
 - B. Above 400,000 BTUH but less than 12,500,000 BTUH \$175
 - C. 12,500,000 BTUH and above \$245
- 7. Fired Storage Water Heaters (Above 200,000 BTUH or 120 gallons) \$ 70

(5) Upon completion of an installation the chief inspector or a deputy inspector shall perform a certificate inspection. After correcting any deficiencies noted during the certificate inspection and payment of the required fees the chief inspector will issue an Inspection Certificate.

(6) Any boiler, water heater or pressure vessel installed on or after January 1, 2007 without obtaining the required permit shall obtain an installation permit and correct any deficiencies identified during the certificate inspection before an Inspection Certificate can be issued. If additional inspections are required to confirm the adequacy of the required corrective actions the applicable inspection fees will be charged.

AUTHORITY: section 650.215, RSMo 2000. Original rule filed March 23, 2006, effective Dec. 20, 2006. Emergency amendment filed Dec. 22, 2008, effective Jan. 1, 2009, expired June 29, 2009. Amended: Filed Dec. 22, 2008, effective June 30, 2009.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.*

11 CSR 40-2.030 Power Boilers

PURPOSE: This rule is to address the design, construction, installation, and operation of power boilers.

(1) As used in this rule, the term “these rules” is intended to mean 11 CSR 40-2.010 through 11 CSR 40-2.065.

(2) Power Boilers Installed or Contracted for, Prior to November 12, 1986.

(A) The service life of any boiler of standard construction shall be unlimited provided it meets the inspection requirements of 11 CSR 40-2.022.

(B) The service life of any nonstandard boiler shall be thirty (30) years. The thirty (30)-year life may be extended with the chief inspector’s approval and compliance with the following requirements:

1. The operating pressure cannot exceed the maximum allowable working pressure (MAWP). The boiler MAWP shall be calculated in accordance with American Society of Mechanical Engineers (ASME) Section I Code or the requirements of the original Code of construction. Boilers manufactured to a standard other than the ASME Code shall be evaluated in accordance with the “state special” requirements of 11 CSR 40-2.064. The allowable stress shall be no greater than twenty-two percent (22%) of the tensile strength of the material. If the tensile strength is unknown, an allowable stress of twelve thousand pounds per square inch (12,000 psi) shall be used. The joint efficiency shall be in accordance with the appropriate edition and addenda of the ASME Section I Code or the *National Board Inspection Code (NBIC)*;

2. Biennial pressure test shall be performed at or above normal operating pressure, not to exceed the MAWP of the boiler. The pressure test shall be held for at least thirty (30) minutes and documented to the satisfaction of the inspector. The inspector need not witness the test. If the boiler exhibits any leaks, the boiler shall be repaired prior to restoring it to service;

3. All safety devices and controls required by the ASME Section I Code and these rules shall be installed and operable.

(3) Power Boilers Installed or Contracted for After November 12, 1986.

(A) New and second hand boilers shall be designed, fabricated, and installed in accordance with the ASME Section I Code and



these rules.

(B) Reinstalled boilers may be of standard or nonstandard construction and shall be installed in accordance with the requirements of the ASME Code and these rules. Approval of the chief inspector shall be obtained prior to reinstalling a nonstandard boiler.

(4) Boiler external piping (BEP) shall be designed, fabricated, and installed in accordance with the ASME Section I and B31.1 Codes. The piping is considered part of the boiler unit and need not be separately tagged and inspected.

(A) Installations made, or contracted for, after November 12, 1986, shall meet the requirements of ASME Section I, and B31.1 Codes and these rules for boiler external piping except as follows:

1. BEP assembled by bolting, threading, or other mechanical means need not be installed by an ASME certificate holder provided all of the following apply:

A. The MAWP of the boiler does not exceed one hundred fifty (150) psi; and

B. The maximum pipe size does not exceed two inches (2") nominal pipe size (NPS); and

C. The maximum operating temperature does not exceed four hundred degrees Fahrenheit (400 °F); and

D. The piping is schedule 80 or greater SA-53 or SA-106 material; and

E. All valves, flanges, and fittings are American National Standards Institute (ANSI) class 150 or greater; and

F. All welding, including attachments and seal welds are by an ASME certificate holder; and

G. The completed installation is tested in accordance with the American Society of Mechanical Engineers Code Section I.

(B) Installations made prior to November 12, 1986, may remain in service provided the installation is acceptable to the inspector.

(5) General Requirements for Power Boilers.

(A) Boilers with heat input less than 12,500,000 British thermal units per hour (Btu/hr) contracted after January 1, 2004, shall meet the requirements of ASME CSD-1. Fuel gas piping for these boilers shall comply with the requirements of National Fire Protection Association (NFPA) 54. Oil burning equipment shall comply with the requirements of NFPA 31. Single unit boilers with heat input greater than or equal to 12,500,000 Btu/hr, boilers with pulverized fuel systems, and waste heat boilers shall meet the requirements of NFPA 85. All controls required by NFPA 85 for automatically fired boilers shall be installed in accordance

with the installation requirements of ASME CSD-1. Existing installations are exempt from these rules except that any modification or replacements to the controls after January 1, 2004, shall meet the requirements for new installations. Boilers installed on or after January 1, 2010, must be in accordance with the National Board Inspection Code, Part 1, and these rules.

(B) A pressure-reducing valve is required in the fluid supply to a boiler when the fluid supply pressure exceeds the maximum allowable working pressure of the boiler. All devices shall operate so as to protect the lowest pressure rated object from an over pressure condition.

(C) Blowoff/blowdown equipment shall meet the requirements of the National Board Rules and Recommendations for the Design and Construction of Boiler Blowoff Systems. Blowoff tanks shall be constructed to the ASME Section VIII, Division 1 Code.

(D) All safety and safety relief valve outlets shall be piped to a safe discharge. There shall be no valves on the outlet piping or between the boiler and the safety or safety relief valve inlet. The end of all discharge piping shall be visible to the operator when piped into a drain. Drains on safety or safety relief valve bodies shall remain open at all times. Safety or safety relief valve inlets and outlets shall not be reduced. Weighted-lever safety valves are prohibited. Safety valves with either the seat or disk of cast iron are prohibited. The minimum valve capacity shall be in accordance with ASME Section I Code. Alternatively, the capacity shall be determined based on the burner output rating or by multiplying the heating surface in square feet by the applicable value in the following table.

Minimum Pounds of Steam per Hour per Square Foot of Heating Surface

	Fire Tube Boiler	Water Tube Boiler
Boiler		
Hand fired	5	6
Stoker fired	7	9
Oil, gas, pulverized fuel fired	8	10
Waterwall		
Hand fired	8	8
Stoker fired	10	12
Oil, gas, pulverized fuel fired	14	16

When a boiler is fired only by a gas having a heat value not in excess of two hundred British thermal units per cubic foot (200

Btu/cu. ft.), the minimum safety or safety relief valve capacity may be based on the value given for hand fired boilers. The minimum safety or safety relief valve capacity for electric boilers shall be 3.5 pounds per hour per kilowatt input.

(E) Each boiler shall be safely supported. There shall be no excessive vibration in either the boiler or the connecting piping.

(F) All existing boilers shall have adequate clearance on all sides and top to facilitate repair, maintenance, and inspection. Boilers installed or reinstalled on or after January 1, 2010, shall meet the following requirements:

1. There shall be at least thirty-six inches (36") of clearance on each side of the boiler. Boilers in battery shall not be installed any closer than forty-eight inches (48"). The front and rear of the boiler shall not be located nearer than thirty-six inches (36") from any wall or structure;

2. Boilers shall be installed to allow for removal and installation of tubes;

3. Boilers with top-opening manholes shall have at least eighty-four inches (84") of unobstructed clearance above the manhole to the ceiling of the boiler room;

4. Boilers without top-opening manholes shall have at least thirty-six inches (36") clearance from the top of the boiler; and

5. Boilers with bottom openings used for inspection or maintenance shall have at least twelve inches (12") of unobstructed clearance.

6. Note: Alternatively, clearances in accordance with the manufacturer's recommendations are subject to the approval of the chief inspector.

(G) All rooms containing boilers and/or water heaters with a combined capacity over one (1) million Btu/hr and over five hundred (500) square feet floor area shall have at least two (2) exits remotely located from each other.

(H) Ladders and runways shall be provided between or over the top of boilers installed or reinstalled on or after January 1, 2010, that are more than eight feet (8') above the operating floor to afford accessibility for normal operation, maintenance, and inspection. These ladders and runways must be built and installed in accordance with the National Board Inspection Code, Part 1.

(I) Combustion air—The boiler room shall have an adequate air supply to permit clean, safe combustion, minimize soot formation, and maintain a minimum of nineteen and one-half percent (19.5%) oxygen in the air of the boiler room. The combustion and ventilation air shall be supplied by an unobstructed opening or by power ventilation or fans.

1. Unobstructed air openings shall be sized on the basis of one (1) sq. in. (6.50 sq. mm) free area per two thousand British



thermal units per hour (2,000 Btu/hr) (five hundred eighty-six watts per hour (586 W/hr)) maximum fuel input of the combined burners located in the boiler room or as specified in the National Fire Protection Association (NFPA) standards for oil and gas burning installations for the particular job conditions. The boiler room air supply openings shall be kept clear at all times.

2. Power ventilators or fans shall be sized on the basis of 0.2 cfm (.0057 cubic meters per minute) for each one thousand British thermal units per hour (1,000 Btu/hr) (two hundred ninety-three watts per hour (293 W/hr)) of maximum fuel input for the combination burners of all boilers located in the boiler room. Additional capacity shall be required for any other fuel burning equipment in the boiler room.

3. When power ventilators or fans are used to supply combustion air, they shall be installed with interlock devices so that the burners will not operate without an adequate number of ventilators/fans in operation.

4. When combustion air is supplied to the boiler by an independent duct, with or without the employment of power ventilators or fans, the duct shall be sized and installed in accordance with the manufacturer's recommendations. However, ventilation of the boiler room must still be considered.

5. Care should be taken to ensure that steam and water lines are not routed across combustion air openings, where freezing may occur.

6. Opening boiler room door(s) and/or window(s) is unacceptable for supplying combustion air.

(J) Controls—

1. Oil-fired, gas-fired, and electrically heated boilers shall be equipped with suitable primary (flame safeguard) safety controls, limit switches, and burners or electric elements that are labeled and listed by a nationally or internationally recognized standard.

2. All controls and devices shall be installed in accordance with the manufacturer's recommendations, and/or industry standards, as applicable.

3. All automatically fired boilers shall have a disconnecting means capable of being locked in the open position and shall be installed at an accessible location in the same room as the object. This disconnect means shall disconnect all sources of potential from the object.

4. A manually operated remote shutdown switch or circuit breaker shall be located just outside the entrance door of the room the object is located in and be marked for easy identification. Consideration should be given to the type and location of the switch to safeguard against tampering. If the entrance door is on the building exterior, the switch

should be located just inside the door. If there is more than one (1) door to the room, there should be a switch located at each door. The emergency switch must be installed in accordance with the manufacturer's instructions or a nationally recognized standard and must cause a safety shutdown and lockout.

(K) Code nameplates shall remain readily accessible at all times. Loose or missing nameplates shall be replaced or reattached as provided for in the NBIC.

(L) Rental boilers used for temporary service shall meet all of the requirements of these rules.

AUTHORITY: section 650.215, RSMo 2000. Original rule filed May 12, 1986, effective Oct. 27, 1986. Amended: Filed Dec. 1, 1987, effective Feb. 11, 1988. Amended: Filed Sept. 27, 1990, effective Feb. 14, 1991. Amended: Filed Oct. 3, 1995, effective April 30, 1996. Rescinded: Filed March 10, 2003, effective Aug. 30, 2003. Readopted: Filed Sept. 25, 2002, effective May 30, 2003. Amended: Filed Jan. 12, 2006, effective June 30, 2006. Amended: Filed June 30, 2009, effective Feb. 28, 2010.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.*

11 CSR 40-2.040 Heating Boiler

PURPOSE: This rule is to address the design, construction, installation, and operation of heating boilers, water heaters, and jacketed steam kettles.

(1) As used in this rule, the term "these rules" is intended to mean 11 CSR 40-2.010 through 11 CSR 40-2.065.

(2) Heating Boilers, Water Heaters, Pool Heaters, and Fired Jacketed Steam Kettles, Installed or Contracted for Prior to November 12, 1986.

(A) The service life of any boiler, water heater, pool heater, or fired jacketed steam kettle of standard construction shall be unlimited, provided:

1. It meets the inspection requirements of 11 CSR 40-2.022; and

2. All controls and safety devices required by American Society of Mechanical Engineers (ASME) Section IV Code for heating boilers and water heaters and ASME Section VIII, Division 1 Code for fired jacketed steam kettles and these rules shall be installed and operable.

(B) The service life of any heating boiler, water heater, pool heater, or fired jacketed steam kettle of nonstandard construction shall be thirty (30) years. The thirty (30)-year life may be extended with the chief inspector's approval and compliance with the following requirements:

1. The operating pressure cannot exceed the maximum allowable working pressure (MAWP). The boiler, water heater, or fired jacketed steam kettle MAWP shall be calculated in accordance with the ASME Code or the requirements of the original code of construction. Objects manufactured to a standard other than the ASME Code shall be evaluated in accordance with the "state special" requirements in accordance with 11 CSR 40-2.064. The allowable stress shall be no greater than eleven thousand pounds per square inch (11,000 psi). The joint efficiency shall be in accordance with the appropriate edition and addenda of the ASME Code, most applicable for the type of construction. The MAWP of any cast iron boiler shall not be greater than fifteen (15) psi steam or thirty (30) psi water pressure;

2. A pressure test shall be conducted every four (4) years at normal operating pressure not to exceed the MAWP of the object. The test pressure shall be held for at least thirty (30) minutes without evidence of leakage and documented to the satisfaction of the inspector. The inspector need not witness the test. The test may be an operational test. If the object exhibits any signs of leakage, it shall be repaired prior to restoring the object to service;

3. All safety devices and controls required by the applicable ASME Code and these rules shall be installed and operable.

(3) Heating Boilers, Water Heaters, Pool Heaters, and Fired Jacketed Steam Kettles Contracted after November 12, 1986.

(A) New and second-hand heating boilers, water heaters, and pool heaters shall be designed, fabricated, and installed to the requirements of ASME Section IV Code and these rules. New and second-hand fired jacketed steam kettles shall be designed, fabricated, and installed to the requirements of ASME Section VIII, Division 1 Code and these rules.

(B) Reinstalled boilers may be of standard or nonstandard construction and shall be installed in accordance with the requirements of the ASME Code and these rules, non-standard heating boilers cannot be reinstalled in Missouri except when relocating from one location to another location within Missouri. Approval of the chief inspector shall be obtained prior to reinstalling a nonstandard



boiler.

(4) General Requirements for Heating Boilers, Water Heaters, Pool Heaters, and Fired Jacketed Steam Kettles.

(A) Heating boilers, water heaters, pool heaters, and fired jacketed steam kettles shall not be operated for a purpose not originally intended by the manufacturer unless approved by the board (i.e., potable water heaters may not be operated as a steam or hot water heating boiler).

(B) Heating boilers, water heaters, pool heaters, and fired jacketed steam kettles must be installed in accordance with the manufacturer's instructions and these rules, unless otherwise approved by the chief inspector.

(C) Heating boilers with heat input less than 12,500,000 British thermal units per hour (Btu/hr) contracted after January 1, 2004, shall meet the requirements of ASME CSD-1. Fuel gas piping for these boilers shall comply with the requirements of National Fire Protection Association (NFPA) 54. Oil burning equipment shall comply with the requirements of NFPA 31. Single unit boilers with heat input greater than or equal to 12,500,000 Btu/hr, boilers with pulverized fuel systems, and waste heat boilers shall meet the requirements of NFPA 85. All controls required by NFPA 85 for automatically fired boilers shall be installed in accordance with the installation requirements of ASME CSD-1. Existing installations are exempt from these rules except that any modification or replacements to the controls after January 1, 2004, shall meet the requirements for new installations. Boilers installed on or after January 1, 2010, must be in accordance with the National Board Inspection Code, Part 1, and these rules.

(D) All safety and safety relief valve outlets shall be piped to a safe discharge. There shall be no valves on the outlet piping or between the boiler and the safety or safety relief valve inlet. The end of all discharge piping shall be visible to the operator when piped into a drain. Drains on safety or safety relief valve bodies shall remain open at all times. Safety or safety relief valve inlet and outlets shall not be reduced. Weighted lever safety valves are prohibited. Safety valves with either the seat or disk of cast iron are prohibited. The minimum valve capacity shall be in accordance with ASME Section IV Code for heating boilers and hot water heaters and Appendix 19 of ASME Section VIII, Division 1 Code for fired jacketed steam kettles. Alternatively, the relieving capacity for heating boilers may be determined based on the burner output rating or by multiplying the heating surface in square feet by the applicable value in the following table:

Minimum Pounds of Steam Per Hour Per Square Foot of Heating Surface

	Fire Tube Boiler	Water Tube Boiler
Boiler		
Hand fired	5	6
Stoker fired	7	9
Oil, gas, pulverized fuel fired	8	10
Waterwall		
Hand fired	8	8
Stoker fired	10	10
Oil, gas, pulverized fuel fired	14	16

When a boiler is fired only by a gas having a heat value not in excess of two hundred (200) Btu/cubic feet (cu. ft.), the minimum safety or safety relief valve capacity may be based on the value given for hand fired boilers. The minimum safety or safety relief valve capacity for electric boilers shall be three and one-half (3.5) pounds per hour per kilowatt input.

(E) Each heating boiler, water heater, and fired jacketed steam kettle shall be safely supported. There shall be no excessive vibration in either the object or the connecting piping.

(F) All existing heating boilers, water heaters, pool heaters, and fired jacketed steam kettles shall have adequate clearance on all sides and top to facilitate repair, maintenance, and inspection. Heating boilers, water heaters, pool heaters, and fired jacketed steam kettles, installed or reinstalled on or after January 1, 2010, shall meet the following requirements:

1. There shall be at least thirty-six inches (36") of clearance on each side of the boiler. Boilers in battery shall not be installed any closer than forty-eight inches (48"). The front and rear of the boiler shall not be located nearer than thirty-six inches (36") from any wall or structure;

2. Boilers shall be installed to allow for removal and installation of tubes;

3. Boilers with top-opening manholes shall have at least eighty-four inches (84") of unobstructed clearance above the manhole to the ceiling of the boiler room;

4. Boilers without top-opening manholes shall have at least thirty-six inches (36") clearance from the top of the boiler;

5. Boilers with bottom openings used for inspection or maintenance shall have at least twelve inches (12") of unobstructed clearance; and

6. Modular heating boilers that require individual units to be set side by side, front to back, or by stacking may provide clearances

in accordance with the manufacturer's recommendations with the approval of the chief inspector.

7. Note: Alternatively, clearances in accordance with the manufacturer's recommendations are subject to the approval of the chief inspector.

(G) All rooms containing heating boilers, water heaters, and fired jacketed steam kettles with a combined capacity over one (1) million Btu/hr and over five hundred (500) square feet floor area shall have at least two (2) exits remotely located from each other.

(H) Ladders and runways shall be provided between or over the top of boilers installed or reinstalled on or after January 1, 2010, that are more than eight feet (8') above the operating floor to afford accessibility for normal operation, maintenance, and inspection. These ladders and runways must be built and installed in accordance with the National Board Inspection Code, Part 1.

(I) Combustion air—The boiler room shall have an adequate air supply to permit clean, safe combustion, minimize soot formation, and maintain a minimum of nineteen and one-half percent (19.5%) oxygen in the air of the boiler room. The combustion and ventilation air shall be supplied by an unobstructed opening or by power ventilation or fans.

1. Unobstructed air openings shall be sized on the basis of one (1) sq. in. (6.50 sq. mm) free area per two thousand British thermal units per hour (2,000 Btu/hr) (five hundred eighty-six watts per hour (586 W/hr)) maximum fuel input of the combined burners located in the boiler room or as specified in the National Fire Protection Association (NFPA) standards for oil and gas burning installations for the particular job conditions. The boiler room air supply openings shall be kept clear at all times.

2. Power ventilators or fans shall be sized on the basis of 0.2 cfm (.0057 cubic meters per minute) for each one thousand British units per hour (1,000 Btu/hr) (two hundred ninety-three watts per hour (293 W/hr)) of maximum fuel input for the combination burners of all boilers located in the boiler room. Additional capacity shall be required for any other fuel burning equipment in the boiler room.

3. When power ventilators or fans are used to supply combustion air, they shall be installed with interlock devices so that the burners will not operate without an adequate number of ventilators/fans in operation.

4. When combustion air is supplied to the boiler by an independent duct, with or without the employment of power ventilators or fans, the duct shall be sized and installed in accordance with the manufacturer's



recommendations. However, ventilation of the boiler room must still be considered.

5. Care should be taken to ensure that steam and water lines are not routed across combustion air openings, where freezing may occur.

6. Opening boiler room door(s) and/or window(s) is unacceptable for supplying combustion air.

(J) Controls—

1. Oil-fired, gas-fired, and electrically heated heating boilers, water heaters, pool heaters, and fired jacketed steam kettles shall be equipped with suitable primary (flame safeguard) safety controls, limit switches, and burners or electric elements that are labeled and listed by a nationally or internationally recognized standard.

2. All controls and devices shall be installed in accordance with the manufacturer's recommendations, and/or industry standards, as applicable.

3. All automatically fired heating boilers, water heaters, pool heaters, and fired jacketed steam kettles shall have a disconnecting means capable of being locked in the open position and shall be installed at an accessible location in the same room as the object. This disconnect means shall disconnect all sources of potential from the object.

4. A manually operated remote shutdown switch or circuit breaker shall be located just outside the entrance door of the room the object is located in and be marked for easy identification. Consideration should be given to the type and location of the switch to safeguard against tampering. If the entrance door is on the building exterior, the switch should be located just inside the door. If there is more than one (1) door to the room, there should be a switch located at each door. The emergency switch must be installed in accordance with the manufacturer's instructions or a nationally recognized standard and must cause a safety shutdown and lockout.

(K) Each gas-fired water heater contracted after January 1, 2010, must be certified to the American National Standard/CSA Standard for Gas Water Heaters, Volume III (ANSI Z21.10.3 CSA 4.3) and must bear a label as proof of this certification.

(L) Each gas-fired pool heater contracted after January 1, 2010, must meet one (1) of the following—

1. Be certified to the American National Standard/CSA Standard For Gas-Fired Pool Heaters, (ANSI Z21.56 CSA 4.7) and bear the label as proof of this certification; or

2. Commercial pool heaters applications that do not have one hundred percent (100%) of pool loop water flow circulating through the pool heater may be certified to the Amer-

ican National Standard/CSA Standard for Gas Water Heaters, Volume III (ANSI Z21.10.3 CSA 4.3) and must bear a label as proof of this certification, provided the unit must bear a label from the manufacturer as evidence that the water heater has been approved for commercial pool heating applications when installed per the manufacturer's instructions. Additionally, the manufacturer must provide additional listed temperature controls that will limit the water temperature delivered to the pool from exceeding one hundred eight degrees Fahrenheit (108 °F) with details for the installation of these controls.

(M) The Code nameplates shall remain readily accessible at all times. Loose or missing nameplates shall be replaced or reattached as provided for in the *National Board Inspection Code*.

(N) Rental heating boilers, water heaters, and fired jacketed steam kettles, used for temporary service, shall meet all of the requirements of these rules. The internal inspection, required by 11 CSR 40-2.022, may be waived by the inspector, based on documentation that a national board-commissioned inspector has evaluated the internal surfaces of the object within the past twelve (12) months and found the object acceptable for use. An external, in-operation inspection shall be the basis for the inspection certificate. The inspection certificate shall expire no later than twenty-four (24) months from the date of the last internal inspection.

AUTHORITY: section 650.215, RSMo 2000. Original rule filed May 12, 1986, effective Oct. 27, 1986. Amended: Filed Sept. 27, 1990, effective Feb. 14, 1991. Amended: Filed Oct. 3, 1995, effective April 30, 1996. Rescinded: Filed March 10, 2003, effective Aug. 30, 2003. Readopted: Filed Sept. 25, 2002, effective May 30, 2003. Amended: Filed Jan. 12, 2006, effective June 30, 2006. Amended: Filed June 30, 2009, effective Feb. 28, 2010.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.*

11 CSR 40-2.050 Pressure Vessels

PURPOSE: This rule is to address the design, construction, installation and operation of pressure vessels.

(1) As used in this rule, the term "these rules" is intended to mean 11 CSR 40-2.010 through 11 CSR 40-2.065.

(2) Pressure vessels installed or contracted for, prior to November 12, 1986.

(A) The service life of any pressure vessel of standard construction shall be unlimited provided it meets the inspection requirement of 11 CSR 40-2.022.

(B) The service life of any nonstandard pressure vessel shall be thirty (30) years. The thirty (30)-year life may be extended with the chief inspector's approval and compliance with the following requirements:

1. The operating pressure cannot exceed the maximum allowable working pressure (MAWP). The pressure vessel MAWP shall be calculated in accordance with the American Society of Mechanical Engineers (ASME) Section VIII Code or to the requirements of the original code of construction. Objects manufactured to a standard other than the ASME Code shall be evaluated in accordance with the "state special" requirements of 11 CSR 40-2.064. The allowable stress shall be no greater than twenty-two percent (22%) of the tensile strength of the material. If the tensile strength is unknown, an allowable stress of twelve thousand (12,000) pounds per square inch (psi) shall be used. The joint efficiency shall be in accordance with the following for welded and brazed joints;

A. Single lap weld = 0.4

B. Double lap weld = 0.5

C. Single butt weld = 0.6

D. Forge welded = 0.7

E. Brazed (steel) = 0.8

F. Seamless = 0.85 unless radiography of all butt welds is performed

G. Seamless = 1.0 if radiography of butt welds is performed

H. Riveted = use the appropriate ASME Code or the *National Board Inspection Code* (NBIC) rules.

2. The pressure vessel shall be tested every six (6) years at normal operating pressure not to exceed the MAWP of the pressure vessel. The pressure test shall be held for at least thirty (30) minutes and documented to the satisfaction of the inspector. An inspector need not witness the test. Any leaks shall be repaired prior to restoring the object to service.

3. All safety devices and controls required by the ASME Code and these rules shall be installed and operable.

(3) Pressure vessels installed or contracted for after November 12, 1986.

(A) New and second hand pressure vessels shall be designed, fabricated and installed in accordance with the ASME Code and these rules.

(B) Reinstalled pressure vessels may be of standard or nonstandard construction and shall be installed in accordance with the



requirements of the ASME Code and these rules. Approval of the chief inspector shall be obtained prior to reinstalling a nonstandard pressure vessel.

(4) General Requirements for Pressure Vessels.

(A) All pressure vessels shall be equipped with pressure relief devices in accordance with their code of construction. In cases where the original code of construction does not address pressure relief devices, such devices shall be installed in accordance with the most applicable ASME Code.

(B) Each pressure vessel shall be safely supported. There shall be no excessive vibration in either the pressure vessel or the connecting piping.

(C) Pressure vessels shall have adequate clearance on all sides and top to facilitate repair, maintenance and inspection. Manufacturer's recommendations, when provided, shall be followed.

(D) Code nameplates shall remain readily accessible at all times. Loose or missing nameplates shall be replaced or reattached as provided for in the *National Board Inspection Code*.

(E) Rental pressure vessels used for temporary service shall meet all of the requirements of these rules.

AUTHORITY: section 650.215, RSMo 2000. Original rule filed May 12, 1986, effective Oct. 27, 1986. Amended: Filed Oct. 3, 1995, effective April 30, 1996. Rescinded: Filed March 10, 2003, effective Aug. 30, 2003. Readopted: Filed Sept. 25, 2002, effective May 30, 2003.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.*

11 CSR 40-2.060 General Requirements
(Rescinded August 30, 2003)

AUTHORITY: section 650.215, RSMo 1994. Original rule filed May 12, 1986, effective Oct. 27, 1986. Amended: Filed Dec. 1, 1987, effective Feb. 11, 1988. Amended: Filed Sept. 27, 1990, effective Feb. 14, 1991. Amended: Filed Oct. 3, 1995, effective April 30, 1996. Rescinded: Filed March 10, 2003, effective Aug. 30, 2003.

11 CSR 40-2.061 New Installations

PURPOSE: This rule addresses the safe design, construction, installation, inspection, operation, maintenance, and repair of new boilers, water heaters, and pressure vessels.

(1) As used in this rule, the term "these rules" is intended to mean 11 CSR 40-2.010 through 11 CSR 40-2.065.

(2) Minimum construction standards for new boilers, water heaters, and pressure vessels contracted for after November 12, 1986.

(A) All new boilers, water heaters, and pressure vessels shall be designed, constructed, inspected, stamped, and installed in accordance with the American Society of Mechanical Engineers (ASME) Code and these rules, unless exempted from such construction by the Act. Boilers, water heaters, and pressure vessels for which an ASME Manufacturers' Data Report is required shall be registered with the National Board. All pressure vessels in which steam is generated by the application of heat resulting from the combustion of fuel (solid, liquid, or gaseous) or electrical energy for use external to itself shall be classified as a fired steam boiler.

(B) New boilers, water heaters, and pressure vessels may be manufactured to internationally recognized standards with acceptance of the board as outlined in 11 CSR 40-2.064.

AUTHORITY: section 650.215, RSMo 2000. Original rule filed Sept. 25, 2002, effective May 30, 2003. Amended: Filed June 30, 2009, effective Feb. 28, 2010.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.*

11 CSR 40-2.062 Second-Hand and Reinstalled Used Boilers, Water Heaters and Pressure Vessels

PURPOSE: This rule addresses the safe installation of second-hand and reinstalled boilers, water heaters and pressure vessels.

(1) Minimum Requirements for Second-Hand Boilers, Water Heaters and Pressure Vessels.

(A) The owner or user shall obtain approval from the chief inspector prior to installation.

(B) The object must be American Society of Mechanical Engineers (ASME) Code constructed. The manufacturer's data report must be provided to the chief inspector.

(C) A certificate inspection shall be performed by the chief inspector or his/her designee prior to operation.

(D) All welded repairs or alterations shall have been in accordance with the *National Board Inspection Code*.

(2) Minimum Requirements for Reinstalled Boilers, Water Heaters and Pressure Vessels.

(A) The owner or user shall obtain approval from the chief inspector prior to

installation.

(B) A nonstandard boiler, water heater, or pressure vessel cannot be reinstalled in Missouri except when relocating from one (1) location to another location within Missouri.

(C) A certificate inspection shall be performed by the chief inspector or his/her designee prior to operation.

(D) All welded repairs or alterations shall have been in accordance with the *National Board Inspection Code*.

(3) Boilers, water heaters and pressure vessels shall be equipped with piping, fittings and appurtenances that comply with the requirements for new installations.

AUTHORITY: section 650.215, RSMo 2000. Original rule filed Sept. 25, 2002, effective May 30, 2003.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995*

11 CSR 40-2.064 State Special and Variations

PURPOSE: This rule addresses alternatives for the design, construction, installation, inspection and repair of boilers, water heaters and pressure vessels.

(1) Boilers, water heaters and pressure vessels that were contracted for after November 12, 1986 and are not designed or constructed in accordance with the Act and these rules, may be approved by the board as a state special. This paragraph also applies to nonstandard second-hand objects installed after November 12, 1986. The owner or user must submit the following information to the board for consideration:

(A) A signed statement describing the intended use of the object and the reason why the object cannot meet the Act and/or these rules;

(B) Design calculations and drawings, in United States customary units, certified by a licensed professional engineer competent in boiler, water heater or pressure vessel design, as applicable;

(C) Complete details of the design, material, workmanship, and construction shall indicate equivalency to the appropriate American Society of Mechanical Engineers (ASME) Code, the Act and these rules;

(D) The name of the third party inspection agency for the construction;



(E) A data report or other manufacturer's document certifying that the design and construction meets the Code that the object was constructed to; and

(F) Any additional information that the board deems necessary to evaluate the object as being similar to an ASME Code constructed object.

(2) Any variance to the Act and these rules other than described in 11 CSR 40-2.064(1) shall be approved by the board except that a time extension for the inspection required in 11 CSR 40-2.022(3)(C)4., (4)(A) and (5)(A) may be approved by the chief inspector. The owner or user must submit a written request for a variance to the chief inspector indicating why the variance or time extension is necessary.

AUTHORITY: section 650.215, RSMo 2000. Original rule filed Sept. 25, 2002, effective May 30, 2003.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.*

(C) Repair of code required safety or safety relief valves shall be made only by an organization that has obtained a valid Valve Repair (VR) Certificate of Authorization issued by the National Board. The scope to the certificate shall include the appropriate type of valve to be repaired.

AUTHORITY: section 650.215, RSMo 2000. Original rule filed Sept. 25, 2002, effective May 30, 2003.*

**Original authority: 650.215, RSMo 1984, amended 1990, 1993, 1995.*

11 CSR 40-2.065 Repairs/Alterations

PURPOSE: This rule addresses the maintenance and repair of boilers, water heaters and pressure vessels.

(1) Welded Repairs (including welding of attachments to the pressure boundary).

(A) When welded repairs are to be made to boilers, pressure vessels and water heaters, the repair organization must have a valid Certificate of Authorization for use of the "R" symbol issued by the *National Board Inspection Code*.

(B) All work shall conform to the rules of *National Board Inspection Code*, (NB-23) or American Petroleum Institute, (API-510), as applicable.

(2) Alterations.

(A) Alterations must be performed by a repair organization as specified in 11 CSR 40-2.065(1)(A) that has alterations within the scope of their authorization.

(3) Safety Fittings and Appliances.

(A) Should any of these fittings or appliances be removed for any reason, they must be reinstalled and in proper working order before the object is placed in service.

(B) No person shall alter any safety or safety relief valves or pressure relief devices in any manner to maintain a working pressure in excess of that stated on the inspection certificate.