
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—As defined in the latest *National Board Inspection Code* adopted by the board.
- (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) Deputy inspector—Any inspector appointed and employed by the director under the provisions of this Act.
- (12) Director—The state fire marshal or appointed designee.
- (13) Existing installation—Includes any boiler, water heater or pressure vessel constructed, installed, placed in operation, or under contract, on or before November 12, 1986.
- (14) 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.
- (15) Hobby boiler—A boiler operated as a personal hobby and not used for commercial gain.
- (16) 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.
- (17) 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.
- (18) 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.
- (19) Inspector—The chief inspector, deputy inspector, special inspector or owner-user inspector authorized to perform certificate inspections in Missouri.
- (20) *International Mechanical Code*—International Code Council, Inc.
- (21) Jacketed steam kettle—A gas fired or electrically heated kettle with jacket(s), operating at pressure not exceeding fifty (50) psi.
- (22) MAWP—Maximum allowable working pressure.
- (23) National Board (NB)—The National Board of Boiler and Pressure Vessel Inspectors.
- (24) National Board Commission—The commission issued to an inspector by the National Board of Boiler and Pressure Vessel Inspectors.
- (25) *National Board Inspection Code (NBIC)*—The edition and addenda of ANSI/NB-23 currently adopted by the board.
- (26) New installation—Includes all boilers, water heaters or pressure vessels constructed, installed, placed in operation, or under contract, on or after November 12, 1986.
- (27) Nonstandard boiler, water heater or pressure vessel—A boiler, water heater or pressure vessel that does not bear the ASME stamp.
- (28) Object—A boiler, water heater, or pressure vessel.
- (29) 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.
- (30) Power boiler—A boiler in which steam or other vapor is generated at a pressure of more than fifteen (15) psi 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).
- (31) Pressure vessel—A vessel 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 or indirect source, or any combination thereof.

(32) 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.

(33) Repair—As defined in the National Board Inspection Code.

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

(35) 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.

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

(37) 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.

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

(39) Waste heat boiler—An unfired pressure vessel intended for operation in excess of fifteen (15) psi steam for the purpose of producing and controlling an output of thermal energy.

(40) 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 and potable water heaters. The term “water heater” does not include vessels used solely for closed loop hot water heating service.

(41) 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. Readopted: Filed Sept. 25, 2002, effective May 30, 2003.*

**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.

(1) ASME Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers:

- (A) 2001 ASME Boiler and Pressure Vessel Code;
- (B) 2002 Addendum;
- (C) Sections III and XI are exempt from state regulation.

(2) National Board Inspection Code, NB-23—Manual for Boiler and Pressure Vessel Inspectors:

- (A) 2001 Edition; and
- (B) 2001 Addendum.

(3) ASME Code for Power Piping, B31.1 of the American Society of Mechanical Engineers, 2001 Edition.

(4) Code for Controls and Safety Devices for Automatically Fired Boilers CSD-1-1998 Edition of the American Society of Mechanical Engineers.

(5) NFPA 85 Boiler and Combustion Systems Hazards Code, 2001 Edition.

(6) Pressure Vessel Inspection Code, API-510 of the American Petroleum Institute, 1997 Edition.

(7) International Mechanical Code, 2000.

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 40-2.020 Administration

PURPOSE: This rule addresses the safe construction, installation, inspection, operation, maintenance and repair of boilers and pressure vessels in Missouri.

(1) Minimum Construction Standards for Boilers and Pressure Vessels.

(A) All new boilers, pressure vessels, water heaters and storage tanks, unless otherwise exempt, to be operated in this jurisdiction, shall be designed, constructed, inspected, stamped and installed in accordance with the American Society of Mechanical Engineers (ASME) Code and these regulations. Boilers and pressure vessels for which an ASME Manufacturer’s Data Report is required shall bear the manufacturer’s National Board (NB) number as registered with the National Board. A copy of the Manufacturer’s Data Report, signed by the manufacturer’s representative and the NB-commissioned inspector, shall be filed with the chief inspector through the National Board.

(B) State Special. If a boiler or pressure vessel cannot bear the ASME and NB stamping or is to be constructed to another code approved by the board, details in the English language and United States customary units of the proposed construction material specifications and calculations shall be submitted to the chief inspector by the owner or user and approval as State Special obtained from the board before construction is started. Copies of all applicable codes and referenced standards shall be made available, as requested, by the board.

(C) Before a second-hand boiler or pressure vessel is installed, application for permission to install it shall be filed by the owner or user with the chief inspector and the chief inspector’s approval obtained.

(D) The following shall be exempt from the ASME Code construction requirements of subsection (1)(A):

1. Water heaters where none of the following limitations are exceeded:
 - A. Heat input of two hundred thousand (200,000) British thermal units (BTU/hr) (57.1kw);
 - B. Water temperature of two hundred ten degrees Fahrenheit (210°F); and
 - C. Nominal water capacity of one hundred twenty gallons (120 g) and which are provided with one (1) or more safety relief valves meeting the requirements of 11 CSR 40-2.040(6); and
2. Coil-type hot water boilers used only for steam vapor cleaning of things such as machinery, equipment and building when

none of the following limitations are exceeded:

A. One inch (1") diameter tubing or three-fourths inch (3/4") nominal pipe size with no steam drums or headers attached;

B. Nominal water containing capacity does not exceed six (6) gallons;

C. Water temperature does not exceed three hundred fifty degrees Fahrenheit (350°F);

D. Steam is not generated within the coil; and

E. One (1) or more safety relief valves meeting the requirements of 11 CSR 40-2.030(6) must be installed and adequate controls are provided.

(E) In any circumstances other than those previously mentioned, the owner or user shall contact the chief inspector.

(2) Frequency of Inspections of Boilers and Pressure Vessels.

(A) Power boilers; high pressure, high temperature water boilers; and waste heat 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. Boilers shall also be annually inspected externally while under normal operating conditions.

(B) Unfired steam boilers shall receive a certificate inspection every year. The inspection shall be an external inspection and an internal inspection, where construction permits.

(C) Waste heat boilers shall receive a certificate inspection every year. The inspection shall be an internal inspection. Boilers shall also be annually inspected externally while under normal operating conditions.

(D) Low pressure boilers, hot water heaters and hot water storage tanks shall receive a certificate inspection every two (2) years.

1. Steam or vapor boilers have an external inspection and an internal inspection every two (2) years, where construction permits.

2. Hot water heating and hot water supply boilers shall have an external inspection every two (2) years and, where construction permits, an internal inspection at the discretion of the inspector.

3. Water heaters including hot water storage tanks shall have an external inspection every two (2) years and shall include the function of all controls and devices.

(E) Except as provided for in subsections (2)(F) and (G), pressure vessels subject to internal corrosion shall receive a certificate inspection every two (2) years. This inspec-

tion shall be internal, where construction permits and where preparation of the vessel for internal inspection does not present a hazard due to the materials involved. Pressure vessels not subject to internal corrosion shall be inspected externally every two (2) years.

(F) Pressure vessels that are under the supervision of an owner-user inspection agency shall be inspected at the same interval unless otherwise agreed upon by the board with the agency.

(G) Nuclear power plants, that are included in the Act, shall be inspected as provided by Section XI of the *ASME Code*.

(H) Based upon documentation of actual service conditions by the owner or user of the operating equipment, the board, in its discretion, may permit variations in the inspection frequency requirements as provided in the Act.

(3) Notification of Inspection. Certificate inspection, as required in section (2), shall be carried out prior to the expiration date of the certificate at a time mutually agreeable to the inspector and owner or user. External inspections may be performed by the inspector during reasonable hours and without prior notification. When, as a result of external inspection or determination by other objective means, it is the inspector's opinion that continued operation of the boiler or pressure vessel constitutes a menace to public safety, the inspector may request an internal inspection or an appropriate pressure test or both to evaluate conditions. In these instances the owner or user shall prepare the boiler or pressure vessel for the inspections or tests as the inspector designates.

(4) Examination for an Inspector's Certificate of Competency.

(A) Examination for an inspector's certificate of competency shall be held at the office of the board or at any other location to be selected by the board, four (4) times each year, namely the first Wednesday and one-half (1/2) day Thursday in the months of March, June, September and December. An applicant for an examination 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 high pressure boilers and pressure vessels;

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

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

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

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

C. As an inspector of high pressure boilers and pressure vessels.

(B) Applications for examination shall be in writing on a form to be furnished by the chief inspector stating the education of the applicant, a list of the applicant's employers, the applicant's period of employment and position held with each employer. Applications containing willful falsifications or untruthful statements shall be cause for rejection. Applications shall be submitted to the chief inspector at least forty-five (45) days prior to the date of examination. If the applicant's education and experience are acceptable to the board, the applicant shall be given a written examination dealing with the construction, maintenance and repair of boilers and pressure vessels and their appurtenances and the applicant shall be accepted or rejected on the merits of this examination. If the applicant is successful in meeting the requirements of the board, a certificate of competency will be issued by the chief inspector when the applicant is employed on a full-time basis by an authorized inspection agency as defined in 11 CSR 40-2.010(6) and (26). Upon the expiration of ninety (90) days, an applicant who failed to pass the examination will be permitted to take another written examination and the applicant's acceptance or rejection will be determined by the board on the basis of this examination.

(5) Examination Fees. A fee as required in section (14) will be charged for each applicant (for each examination) taking the examination for a certificate of competency.

(6) Certificate of Competency and Identification Card.

(A) Upon the request of the applicant's employer, a certificate of competency and an identification card may be issued by the chief inspector to the following:

1. An inspector who is employed by the jurisdiction;

2. An inspector who is employed full-time by an insurance company which is authorized to insure and does insure against loss from explosions of boilers and pressure vessels in the jurisdiction;

3. An inspector employed as described in either paragraph (6)(A)1. or 2. who conducts shop or field inspections of new boilers, pressure vessels or nuclear components in

accordance with the applicable *ASME Code* requirements; or

4. An inspector who is continuously employed by a company which operates pressure vessels in this state and has a valid owner-user inspection agency agreement as provided for in section (11), provided that the applicant has satisfactorily passed the examination as set forth in section (4) or holds a valid commission or certificate of competency from a state that has a standard of examination substantially equal to that of this jurisdiction and a valid commission and a current commission card issued by the National Board.

(B) The request for the certificate of competency and identification card shall be completed on forms to be provided by the chief inspector and shall be accompanied by, when applicable, a facsimile of the applicant's commission and commission card, certificate of competency and identification card as mentioned previously and a fee as required in section (14).

(C) The certificate of competency and valid identification card shall be returned to the chief inspector when the inspector, to whom they were issued, is no longer employed by the organization employing the inspector at the time that the certificate was issued.

(D) Each person holding a valid certificate of competency and who conducts inspections as provided by the Act shall apply to the chief inspector on forms provided and obtain a renewal identification card annually. A fee as required in section (14) for each card shall accompany each application.

(E) An inspector's certificate of competency may be suspended by the chief inspector after due investigation and recommendation by the board for neglect of duty, incompetency, untrustworthiness or conflict of interest of the holder of the certificate, or for willful falsification of any matter or statement contained in the inspector's application or in a report of any inspection made by the inspector. Written notice of any suspension shall be given, within not more than ten (10) days, by the chief inspector, to the inspector and the inspector's employer. Persons whose certificates of competency have been suspended shall be entitled to an appeal to the board as provided for in the Act and to be present in person and represented by counsel at the hearing of the appeal.

(7) Conflict of Interest. An inspector shall not engage in the sale of any services, article or device relating to boilers, pressure vessels or their appurtenances.

(8) Inspection Reports to Be Submitted by Inspectors.

(A) Inspectors, within one (1) year of the effective date of these rules (October 27, 1986) for boilers and three (3) years for pressure vessels, shall submit to the chief inspector an inspection report on forms acceptable to the board for each boiler and pressure vessel subject to inspection in this state. Forms NB-5, NB-6, NB-7 and the Missouri Boiler and Pressure Vessel-Report of Inspection are three (3) acceptable forms. Complete data shall be submitted on forms acceptable to the board for each nonstandard boiler or pressure vessel.

(B) Subsequent inspections by deputy and special inspectors of both standard and nonstandard boilers and pressure vessels shall be reported on forms acceptable to the board.

(C) Inspection reports as required in subsections (8)(A) and (B) shall be submitted within thirty (30) days from the date of inspection.

(D) Owner-user inspection agencies shall report in accordance with subsections (8)(B) and (C), or upon forms acceptable to the board, which shall be filed as provided in section (11).

(9) Insurance Companies to Notify Chief Inspector of New, Cancelled or Suspended Insurance on Boilers or Pressure Vessels. All insurance companies shall notify the chief inspector, within thirty (30) days, of all boilers or pressure vessels on which insurance is written, cancelled, not renewed or suspended because of unsafe conditions.

(10) Special Inspectors to Notify Chief of Unsafe Boilers and Pressure Vessels. If a special inspector, upon first inspection of a new risk, finds that a boiler or pressure vessel, or any appurtenance of the boiler or pressure vessel, is in a condition that the inspector's company would refuse insurance, the company immediately shall notify the chief inspector and submit a report on the defects. If upon inspection a special inspector finds a boiler or pressure vessel to be unsafe for further operation, the inspector shall promptly notify the owner or user, stating what repairs or other corrective measures are required to bring the object into compliance with these rules. Unless the owner or user makes repairs or adopts other corrective measures promptly, the special inspector immediately shall notify the chief inspector. Until the corrections have been made, no further operation of the boiler or pressure vessel involved shall be permitted. If an inspection certificate for the object is required and is in force, it shall be suspended by the chief inspector. When rein-

spection establishes that the necessary repairs have been made or corrective actions have been taken and the boiler or pressure vessel is safe to operate, the chief inspector shall be notified. At that time an inspection certificate, where applicable, will be issued.

(11) Owner-User Inspection Agency.

(A) Any person, firm, partnership or corporation operating pressure vessels in this jurisdiction may seek approval and registration as an owner-user inspection agency by filing an application with the chief inspector on prescribed forms and request approval by the board.

(B) Application and registration shall show the name of the agency and its principal address in this state and the name and address of the person(s) having supervision over inspections made by the agency. Changes in supervisory personnel shall be reported to the chief inspector within thirty (30) days after the change.

(C) Each owner-user inspection agency as required by the provisions of the Act and these regulations shall—

1. Conduct inspections of pressure vessels, not exempt by the Act, utilizing only qualified inspection personnel, as provided in section (6);

2. Retain on file at the location where the equipment is inspected, a true record or copy of each of the latest inspection reports signed by the inspector;

3. Execute and deliver to the chief inspector and those responsible for the operation of the pressure vessel, a true report of each inspection together with appropriate requirements or recommendations that result from the inspections;

4. Notify promptly the chief inspector of any pressure vessel which does not meet the requirements for safety;

5. Maintain inspection records which will include a list of each pressure vessel covered by the Act, showing a serial number and abbreviated descriptions as may be necessary for identification, the date of last inspection of each unit and approximate date for the next inspection, arrived at by applying the appropriate rules to all data available at the time the inspection record is compiled. Information regarding frequency and type of inspection is provided in section (2). The inspection record shall be readily available for examination by the chief inspector or his/her authorized representative during business hours; and

6. Submit to a periodic audit of the owner-user program and records, at least triennially. Fees will be in accordance with the rates established in section (14).



(12) Defective Conditions Disclosed at Time of External Inspection. If, upon external inspection, there is evidence of a leak or crack, sufficient covering of the boiler or pressure vessel shall be removed to permit the inspector to satisfactorily determine the safety of the boiler or pressure vessel. If the covering cannot be removed at that time, the inspector may order the operation of the boiler or pressure vessel stopped until such time as the covering can be removed and proper examination made.

(13) Owner or User to Notify Chief Inspector of Accident. When an accident occurs to a boiler or pressure vessel, the owner or user promptly shall notify the chief inspector by submitting a detailed report of the accident. In the event of a personal injury or any explosion, notice shall be given immediately by telephone, telegraph or messenger, and neither the boiler or pressure vessel, nor any parts of the boiler or pressure vessel, shall be removed or disturbed before permission has been given by the chief inspector, except for the purpose of saving human life and limiting consequential damage.

(14) Inspection Certificate, Inspection and Miscellaneous Fees.

(A) If a boiler or pressure vessel after inspection, is found to be suitable and to conform to these regulations, the owner or user shall pay directly to the jurisdiction a fee in accordance with the schedule of fees. Checks and money orders for payment of all fees should be made payable to the Division of Fire Safety.

Fee Schedule

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| Examination Fees | \$50.00 |
| Commissions | |
| New Issuance | \$50.00 |
| Renewal | \$25.00 |
| Certificate of Inspection | \$20.00 |
| Inspections | |
| Power Boilers & High Temp Hot Water Heating Boilers | |
| Internal Inspections— | |
| Boilers of 4,000 lbs/hr Capacity or Less | \$35.00 |
| Boilers Over 4,000 lbs/hr up to 16,000 lbs/hr Capacity | \$60.00 |
| Boilers With 16,000 lbs/hr or More | Hourly Rate |
| External Inspections— | |
| Boilers of 4,000 lbs/hr Capacity or Less | \$25.00 |
| Boilers of Over 4,000 lbs/hr Capacity | \$35.00 |

Heating Boilers and Hot Water Supply Boilers
 Internal Inspections—
 Boilers of 4,000 lbs/hr Capacity or Less \$35.00
 Boilers of Over 4,000 lbs/hr Capacity \$45.00
 External Inspections—
 Hot Water Heating and less than or equal to 15 psi
 Steam Boilers \$25.00
 Hot Water Supply Boilers and Water Heaters, Jacketed Kettles, Storage Water Heaters \$18.00
 Pressure Vessels
 Fees are Based on the Volume in cu. ft. 500 cu. ft. or Less \$16.00
 Over 500 cu. ft. \$25.00
 Internal Inspection Requiring Entry Hourly Rate
 No more than \$120 shall be charged for any one pressure vessel in any one year for routine certificate inspections.

Miscellaneous
 Accreditation Reviews—ASME and National Board \$1,000.00
 (includes all travel and preparation time and all expenses)
 Each Hour or Part Thereof Up to Eight Hours \$35.00
 Each Hour or Part Thereof Over Eight Hours in Any One Day \$50.00
 (per hour fees are plus mileage and lodging)

(B) Disposition of Fees. The chief inspector shall account for and transfer all fees so received to the director of revenue.

(C) If the owner or user of a boiler or pressure vessel which is required to be inspected refuses to allow an inspection to be made or refuses to pay the fee stipulated, a new inspection certificate shall not be issued. If a valid inspection certificate exists, it shall be suspended by the chief inspector until the owner or user complies with the requirements.

(D) The owner or user who causes a boiler or pressure vessel to be operated without a valid certificate shall be subject to the penalty as provided for in the Act. It is the owner's responsibility to assure a valid certificate of inspection is posted at the location of the object.

(15) Validity of Inspection Certificate. An inspection certificate, issued in accordance with section (14), shall be valid until expiration unless some defect or condition affecting the safety of the boiler or pressure vessel is disclosed provided, however, that a certificate

issued for a boiler or pressure vessel inspected by a special inspector shall be valid only if the boiler or pressure vessel for which it was issued continues to be insured by a duly authorized insurance company.

(16) Restamping Boilers and Pressure Vessels. When the stamping on a boiler or pressure vessel becomes indistinct, the inspector shall instruct the owner or user to have it restamped. Request for permission to restamp the boiler or pressure vessel shall be made to the chief inspector and proof of the original stamping shall accompany the request. The chief inspector may grant the authorization. Restamping shall be in accordance with the *National Board Inspection Code*. Notice of completion of the restamping shall be filed with the chief inspector by the inspector who witnessed the stamping on the boiler or pressure vessel, together with a facsimile of the stamping applied.

(17) Penalty for Operation of Unsafe Boilers or Pressure Vessels.

(A) If, upon inspection, a boiler or pressure vessel is found to be in a condition that it is unsafe to operate, the inspector shall notify the chief inspector and the inspection certificate may be suspended by the chief inspector.

(B) Any person, firm, partnership or corporation causing the boiler or pressure vessel to continue to be operated shall be subject to the penalty provided in the Act.

(18) Condemned Boilers and Pressure Vessels.

(A) Any boiler or pressure vessel having been inspected and declared unfit for further service by an inspector shall be stamped by the chief inspector or a deputy inspector on either side of the state number with the letters XXX as shown by the following facsimile, which will designate a condemned boiler or pressure vessel:

XXX MO XXX

This stamping shall be applied directly to the boiler or pressure vessel, whenever possible.

(B) Any person, firm, partnership or corporation using, or offering for sale, a condemned boiler or pressure vessel for operation within this state shall be subject to the penalties provided by the Act.

(19) Reinstallation of Boilers or Pressure Vessels. When a standard boiler or pressure vessel located in this jurisdiction is to be moved outside the jurisdiction for temporary use or repair, application shall be made by the

owner or user to the chief inspector for permission to reinstall the boiler or pressure vessel in the jurisdiction. When a nonstandard boiler or pressure vessel is removed from this state, it shall not be reinstalled within this state.

(20) Installation, Operation, Sale or Offering for Sale of Nonstandard Boilers or Pressure Vessels. The installation, operation, sale or the offering for sale of nonstandard boilers or pressure vessels in this jurisdiction is prohibited without permission from the board.

(21) Installation of Used or Second-Hand Boilers or Pressure Vessels. Before a used or second-hand boiler or pressure vessel can be installed in this state, an inspection must be made by an inspector qualified by this jurisdiction. Data submitted by the inspector shall be filed by the owner or user of the boiler or pressure vessel with the chief inspector for approval. An internal and external certificate inspection of the object shall be made by an inspector qualified by this jurisdiction, prior to issuance of a certificate of inspection for the object. The inspection shall be documented on a form acceptable to the chief inspector. Boilers and pressure vessels, when installed in the jurisdiction, shall be equipped with fittings and appurtenances that comply with the regulations for new installations, in effect on the date of the installation. Exceptions must be referred to the chief inspector for resolution.

(22) Reinstalled Boilers or Pressure Vessels. When a stationary boiler or pressure vessel is moved and reinstalled, the attached fittings and appurtenances shall comply with these regulations for new installations, in effect on the date of the installation. Exceptions must be referred to the chief inspector for resolution.

(23) Working Pressure for Existing Installations. Any inspector may decrease the working pressure on any existing installation if the condition of the boiler or pressure vessel warrants it. If the owner or user does not concur with the inspector's decision, the owner or user may appeal to the board which may request a joint inspection by the chief inspector or a deputy inspector and the inspector. The chief inspector shall render a report to the board and the board shall render the final decision, based upon the data contained in the inspector's reports.

(24) Repairs and Alterations.

(A) When repairs or alterations are to be made to boilers and pressure vessels, permis-

sion shall be obtained from an inspector before the work is started. Organizations making repairs or alterations, must have one (1) of the following authorizations:

1. A valid certificate of authorization for use of the R symbol, issued by the National Board; or

2. A certificate of authorization from the board of boiler and pressure vessel rules.

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

(25) Riveted Patches. In applying riveted patches, the design and method of installation shall meet the requirements of subsection (24)(B).

(26) Safety Appliances.

(A) No person shall attempt to remove or do any work on any safety appliance prescribed by these regulations while the appliance prescribed is subject to pressure.

(B) Should any of these appliances be removed for repair during an outage of a boiler or pressure vessel, they must be reinstalled and in proper working order before the object is again placed in service.

(C) 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 boiler or pressure vessel inspection certificate.

(D) Repair of ASME- and NB-stamped safety or safety relief valves shall be made only by an organization which holds a valid Certificate of Authorization for use of the NB Safety or Safety Relief Valve Repair VR symbol stamp and the scope of the certificate includes the appropriate type of valve to be repaired.

(27) Requirements For New Installations.

(A) No boiler or pressure vessel shall be installed in this state after October 27, 1986, unless it has been constructed in accordance with the *ASME Code*, registered with the NB and installed in conformity with these regulations except—

1. Those exempt by the Act; or

2. Those outlined in subsection (1)(B) of this rule.

(B) The stamping shall not be concealed by lagging or paint and shall be exposed at all times unless a suitable record is kept of the location of the stamping so that it may be readily uncovered at any time this may be desired.

(28) Application of State Serial Numbers.

(A) Upon completion of the installation of a boiler or pressure vessel or at the time of

the initial certificate inspection of an existing installation, each boiler or pressure vessel shall be stamped by the inspector with a serial number of the state, consisting 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 may not be transferred to any other object. The tag or stamping shall be placed as close to the ASME nameplate or stamping, as practicable.

(B) All cast iron, low pressure heating boilers (including all "HLW" stamped hot water supply boilers) shall have securely attached to the front of the boiler a corrosion-resistant metal tag of not less than one inch by four inches (1" x 4") in size which shall have the serial number of the state stamped on it. All pressure vessels constructed of cast iron, or of material of a thickness that it should not be stamped, shall have securely attached a corrosion-resistant metal tag not less than one inch by four inches (1" x 4") in size which shall have the serial number of the state stamped on it.

(29) Variations.

(A) Any person who believes the rules promulgated by the board are unreasonable or impose an undue burden upon the owner or user may request a variation from the rule. The request for variation shall be in writing and shall specify how equivalent safety is to be maintained. The board, after investigation and hearing as it may direct, may grant a variation from the terms of any rule provided special conditions as may be specified are maintained in order to provide equivalent safety.

(B) When there is reason to believe, or upon receipt of a complaint that a variation does not provide freedom from danger equivalent to that described the published rule, the board, after notice to the owner or user and complainant after the hearing and investigation as it may direct, may continue in force, suspend, revoke or modify the conditions specified in any variation. No declaration, act or omission of the board or of the chief inspector, deputy inspectors or special inspectors other than a written order authorizing a variation as permitted previously, shall be deemed to exempt, either wholly or in part, expressly or implied, any owner or user from full compliance with the terms of any rule.

(30) Penalties. Any person, firm or corporation violating any of the provisions of these rules shall be guilty of a misdemeanor and subject to a fine to be collected by suit or through compromise as provided for in section 650.270, RSMo of the Act. Each day of operation in violation of the provisions shall be considered a separate offense.

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.*

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

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 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" × 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 inspec-

tions shall verify compliance with subsection (3)(C) of this rule.

(4) Frequency of inspection of heating boilers, water heaters, and 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 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 and 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 grates 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 conve-

nient point or any other appropriate means approved by the inspector;

9. Before opening the manhole or hand-hole 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 forms acceptable to the board for each boiler, water 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. 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 | Hourly Rate |
| or greater | |

B. External Inspections—

| | |
|-------------------------------|------|
| 4,000 lbs/hr capacity or less | \$25 |
| Over 4,000 lbs/hr | \$35 |

2. Heating Boilers, Water Heaters, and Fired Vessels:

A. Internal inspections—

| | |
|-------------------------------|------|
| 4,000 lbs/hr capacity or less | \$35 |
| 4,000–Over 4,000 lbs/hr | \$45 |

B. External inspections—

| | |
|--|------|
| Hot water heating less than or equal to 15 psi steam boilers | \$25 |
| Hot water supply boilers, water heaters, | |
| 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 (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.*

**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 of 12,500,000 British thermal units per hour (Btu/hr) or less contracted for after January 1, 2004 shall meet the requirements of ASME CSD-1. Sin-

gle unit boilers with heat input greater than 12,500,000 Btu/hr shall meet the requirements of National Fire Protection Association (NFPA) 85. 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.

(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) Boilers shall have adequate clearance on all sides and top to facilitate repair, maintenance and inspection. Manufacturer's recommendations should be followed but in no case shall the clearance be less than eighteen inches (18") on all sides of the boiler, and forty-eight inches (48") on the burner end.

(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) Combustion air shall be provided for each boiler room and shall meet the following requirements:

1. A permanent source of air from outside the building shall be provided for each boiler room to permit satisfactory combustion of fuel for the objects as well as provide proper ventilation of the boiler room under normal operating conditions;

2. The total requirements of the burners for all coal, oil, or gas fired objects shall be used to determine the air opening(s). The following minimums shall be met:

A.

| Input (Btu/hr) | Minimum net required air (cu. ft./min.) | Louvered area (square feet) |
|----------------|---|-----------------------------|
| 500,000 | 125 | 1.0 |
| 1,000,000 | 250 | 1.0 |
| 2,000,000 | 500 | 1.6 |
| 3,000,000 | 750 | 2.5 |
| 4,000,000 | 1,000 | 3.3 |

Note: For heat input greater than 4,000,000 Btu/hr, use the following formula to determine required louvered area: $(\text{Btu/hr}/10,000) \times 2.5 = \text{cu. ft. per minute}$. Divide cu. ft. per minute by 300 = net square feet of louvered area required;

B. Mechanical ventilation may be used in lieu of (5)(H)2.A. above provided the ventilation is interlocked with the burner fan so the firing device will not operate with the fan off. The velocity of air through the ventilating fan shall not exceed five hundred (500) feet per minute and the total air delivered shall be equal to or greater than that shown in (5)(H)2.A.;

C. In lieu of (5)(H)2.A. and (5)(H)2.B., the combustion air requirements

of the *International Mechanical Code* may be used;

D. Combustion air shall not be blocked when the boiler is in operation. Opening boiler room door(s) and/or window(s) is unacceptable for supplying combustion air.

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

(J) 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. Readopted: Filed Sept. 25, 2002, effective May 30, 2003.*

**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 and Fired Jacketed Steam Kettles, Installed or Contracted for Prior to November 12, 1986.

(A) The service life of any boiler, water 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 jacketed steam kettles and these rules, shall be installed and operable.

(B) The service life of any heating boiler, water heater, or jacketed steam kettle of non-standard 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 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 in operation 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 and Fired Jacketed Steam Kettles Contracted for after November 12, 1986.

(A) New and second hand heating boilers and water 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. Approval of the chief inspector shall be obtained prior to reinstalling a nonstandard boiler.

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

(A) Heating boilers, water heaters and 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 with heat input of 12,500,000 British thermal units per hour (Btu/hr) or less, contracted for after January 1, 2004, shall meet the requirements of ASME CSD-1. Single unit boilers with heat input greater than 12,500,000 Btu/hr shall meet the requirements of National Fire Protection Association (NFPA) 85. Existing installations are exempt from these requirements except that any alteration to the controls after January 1, 2004 shall meet the requirements for new installations.

(C) 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 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 3.5 pounds per hour per kilowatt input.

(D) Each heating boiler, water heater and jacketed steam kettle shall be safely support-

ed. There shall be no excessive vibration in either the object or the connecting piping.

(E) Heating boilers, water heaters and jacketed steam kettles shall have adequate clearance on all sides and top to facilitate repair, maintenance and inspection. Manufacturer's recommendations shall be followed, but in no case shall the clearance be less than eighteen inches (18") on all sides of the boiler and forty-eight inches (48") on the burner end.

(F) All rooms containing heating boilers, water heaters and 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.

(G) Combustion air shall be provided for each room and shall meet the following requirements:

1. A permanent source of air from outside the building shall be provided for each boiler room to permit satisfactory combustion of fuel for the objects as well as provide proper ventilation of the boiler room under normal operating conditions;

2. The total requirements of the burners for all coal, oil, or gas fired objects shall be used to determine the air opening(s). The following minimums shall be met:

| Input (Btu/hr) | A. | |
|----------------|---|-----------------------------|
| | Minimum net required air (cu. ft./min.) | Louvered area (square feet) |
| 500,000 | 125 | 1.0 |
| 1,000,000 | 250 | 1.0 |
| 2,000,000 | 500 | 1.6 |
| 3,000,000 | 750 | 2.5 |
| 4,000,000 | 1,000 | 3.3 |

Note: For heat input greater than four (4) million Btu/hr, use the following formula to determine required louvered area: $(\text{Btu/hr}/10,000) \times 2.5 = \text{cu. ft. per minute}$. Divide cu. ft. per minute by 300 = net square feet of louvered area required;

B. Mechanical ventilation may be used in lieu of 11 CSR 40-2.040(4)(G)2.A. provided the ventilation is interlocked with the burner fan so the firing device will not operate with the fan off. The velocity of air through the ventilating fan shall not exceed five hundred (500) feet per minute and the total air delivered shall be equal to or greater than that shown in 11 CSR 40-2.040(4)(G)2.A.;

C. In lieu of 11 CSR 40-2.040(4)(G)2.A. and 11 CSR 40-2.040(4)(G)2.B. the combustion air requirements of the *International Mechanical Code* may be used.

D. Combustion air shall not be blocked when the heating boiler, water heater, or fired jacketed steam kettle is in operation. Opening room door(s) and/or window(s) is unacceptable for supplying combustion air.

(H) 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*.

(I) 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. Readopted: Filed Sept. 25, 2002, effective May 30, 2003.*

**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. 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

PURPOSE: This rule applies to all boilers and pressure vessels.

Editor’s Note: The following material is incorporated into this rule by reference:

- 1) *American Society of Mechanical Engineers Code (ASME Code) (New York City: American Society of Mechanical Engineers, 1995).*

In accordance with section 536.031(4), RSMo, the full text of material incorporated by reference will be made available to any interested person at the Office of the Secretary of State and the headquarters of the adopting state agency.

(1) Inspection of Boilers and Pressure Vessels. All boilers and pressure vessels not exempted by the Act or by rules promulgated under the Act and which are subject to regular inspections shall be prepared for inspections as required in section (2). Standard boilers and pressure vessels, that are exempt from the Act, may be inspected, at the owner’s discretion, provided they are in full compliance with the Act. If in full compliance, an inspection certificate, may be issued.

(2) Preparation for Inspection.

(A) The owner or user shall prepare each power and steam heating boiler or pressure vessel for inspection and shall prepare for and apply a hydrostatic or pressure test, whenever necessary, on the date arranged by the inspector which shall not be less than seven (7) days after the date of notification.

1. Power and steam heating boilers—The owner or user shall prepare a boiler for internal inspection in the following manner:

A. Water shall be drained from and the boiler washed thoroughly;

B. 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;

C. All grates of internally fired boilers shall be removed as required by the inspector;

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

E. The pressure gage shall be removed for testing, as required by the inspector;

F. 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 appropriate means approved by the inspector;

G. Before opening the manhole or handhole covers and entering any parts 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 and drain valves or cocks between the two (2) valves 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 blowoff valves shall be closed, tagged and padlocked. Blowoff lines, where practicable, shall be disconnected between pressure parts and valves. All drains and vent lines shall be opened.

2. Heating boilers, other than steam heating boilers shall be prepared for inspection to the extent deemed necessary by the inspector and in accordance with the applicable procedures outlined in (2)(A)1.

3. Pressure Vessels—Pressure vessels shall be prepared for inspection to the extent deemed necessary by the inspector and the applicable procedures outlined in paragraph (2)(A)1.

(3) Boilers and Pressure Vessels Improperly Prepared for Inspection. If a boiler or pressure vessel has not been properly prepared

for an internal inspection or if the owner or user fails to comply with the requirements for a pressure test as set forth in these rules, the inspector may decline to make the inspection or test and the inspection certificate shall be withheld until the owner or user complies with the requirements.

(4) Removal of Covering to Permit Inspection. If the boiler or pressure vessel is jacketed so that the longitudinal seams of shells, drums or domes cannot be seen, sufficient jacketing, setting wall or other form of casing or housing shall be removed to permit reasonable inspection of the seams and other areas necessary to determine the condition and safety of the boiler or pressure vessel, provided the information cannot be determined by other means.

(5) Riveted-Lap Seam Crack. The shell or drum of a boiler or pressure vessel, in which a riveted-lap seam crack is discovered along a longitudinal riveted joint, shall be immediately discontinued from use. Patching is prohibited. (By riveted-lap seam crack it is meant a crack found in riveted-lap seams, extending parallel to the longitudinal joint and located either between or adjacent to rivet holes.)

(6) Pressure Tests. A hydrostatic pressure test, when applied to boilers or pressure vessels, shall not exceed one and one-half (1 1/2) times the maximum allowable working pressure except as described in the *American Society of Mechanical Engineers (ASME) Code*, Section VIII, Divisions 1 and 2, for vessels designed to higher temperatures requiring a stress ratio to be used in calculating hydrostatic test pressure. The pressure shall be under proper control so that in no case shall the required test pressure be exceeded by more than two percent (2%). During hydrostatic test the safety valve shall be removed or each valve disc shall be held to its seat by means of a testing clamp and not by screwing down the compression screw upon the spring. A plug device designed for this purpose may be used. It is suggested that the minimum temperatures of the water used to apply a hydrostatic test shall be not less than seventy degrees Fahrenheit (70°F), but the maximum temperature during inspection shall not exceed one hundred twenty degrees Fahrenheit (120°F). When a hydrostatic test is applied to determine tightness, the pressure shall be equal to the normal operating pressure but need not exceed the release pressure of the safety valve having the lowest release setting. When the contents of the vessel prohibit contamination by any other medium or

when a hydrostatic test is not possible, other testing media may be used providing the precautionary requirements of the applicable section of the *ASME Code* are followed. In these cases there shall be agreement between the owner and the inspector.

(7) Automatic Low Water Fuel Cutoff and/or Water Feeding Device.

(A) Each automatically fired steam or vapor system boiler; and each hot water heater boiler with a BTU/hr burner input exceeding four hundred thousand (400,000) BTU/hr, shall be equipped with a manual reset, automatic low water fuel cutoff so located as to automatically cut off the fuel supply when the surface of the water falls to the lowest safe water line. If a water feeding device is installed, it shall be so constructed that the water inlet valve cannot feed water into the boiler through the float chamber and so located as to supply requisite feedwater. The lowest safe water line should be not lower than the lowest visible part of the water glass.

(B) The fuel or feedwater control device may be attached directly to a boiler or for low pressure boilers to the tapped openings provided for attaching a water glass directly to the boiler, provided that the connections from the boiler are nonferrous tees or Y's not less than one-half inch (1/2") pipe size between the boiler and the water glass, so that the water glass is attached directly and as close as possible to the boiler; the straightway tapping of the Y or tee to take the water glass fittings and the side outlet of the Y or tee to take the fuel cutoff or water feeding device. The ends of all nipples shall be reamed to full size diameter.

(8) Pressure Reducing Valves.

(A) Where pressure reducing valves are used, one (1) or more safety or safety relief valves shall be provided on the low pressure side of the reducing valve when the piping or equipment on the low pressure side does not meet the requirements for the full initial pressure. The safety or safety relief valves shall be located adjoining or as close as possible to the reducing valve. Proper protection shall be provided to prevent injury or damage caused by the escaping fluid from the discharge of safety or safety relief valves if vented to the atmosphere. The combined discharge capacity of the safety or safety relief valves shall operate so that the pressure rating of the lower pressure piping or equipment shall not be exceeded in case the reducing valve fails in the open position.

(B) The use of hand-controlled bypasses around reducing valves is permissible. If a

bypass is used around the reducing valve, the safety valve required on the low pressure side shall be of sufficient capacity to relieve all the fluid that can pass through the bypass without overpressuring the low pressure side.

(C) A pressure gage shall be installed on the low pressure side of a reducing valve.

(9) Boiler Blowoff Equipment.

(A) The blowdown from a boiler(s) that enters a sanitary sewer system or blowdown which is considered a hazard to life or property shall pass through some form of blowoff equipment that will reduce pressure and temperature as required in this rule.

(B) The temperature of the water leaving the blowoff equipment shall not exceed one hundred fifty degrees Fahrenheit (150°F).

(C) The pressure of the blowdown leaving any type of blowoff equipment shall not exceed five pounds per square inch (5 psi).

(D) All blowoff equipment shall be fitted with openings to facilitate cleaning inspection.

(E) Blowoff equipment shall conform to the provisions set forth in the recommended rules for *National Board Boiler Blowoff Equipment*.

(10) Location of Discharge Piping Outlets. The discharge of safety valves, blowoff pipes and other outlets shall be located and supported so as to prevent injury to personnel. The escape pipe will not impart a load on the relief valve. If an escape pipe is used, it shall be supported and be installed so that water will not stand in the piping or on the safety valve disc seating area.

(11) Supports. Each boiler and pressure vessel shall be supported of sufficient strength and rigidity to safely support the boiler or pressure vessel and its contents. There shall be no excessive vibration in either the boiler, pressure vessel or its connecting piping.

(12) Boiler Door Latches.

(A) A watertube boiler shall have the firing doors of the inward opening type, unless doors are provided with substantial and effective latching or fastening devices or otherwise so constructed as to prevent them, when closed, from being blown open by pressure on the furnace side.

(B) These latches or fastenings shall be of the positive self-locking type. Friction contacts, latches or bolts actuated by springs shall not be used. These requirements for latches or fastenings shall not apply to coal openings of downdraft or similar furnaces.

(C) All other doors, except explosion doors, not used in the firing of the boiler,

may be provided with bolts or fastenings in lieu of self-locking latching devices.

(D) Explosion doors, if used and if located in the setting walls within seven feet (7') of the firing floor or operating platform, shall be provided with substantial deflectors to divert the blast.

(13) Clearance. When boilers and pressure vessels are replaced or new boilers or pressure vessels are installed in either existing or new buildings, a minimum height of at least three feet (3') shall be provided between the top of the boiler proper and the ceiling and at least three feet (3') between all sides of the boiler and adjacent walls or other structures. Boilers and pressure vessels having manholes shall have five feet (5') clearance from the manhole opening and any wall, ceiling or piping that will prevent a person from entering the boiler or vessel. All boilers and pressure vessels shall be so located that adequate space is provided for proper operation of the boilers and pressure vessels and their appurtenances, for the inspection of all surfaces, tubes, waterwalls, economizers, piping, valves and other equipment and for necessary maintenance and repair and replacement of tubes.

(14) Ladders and Runways. When necessary for safety, there shall be a steel runway or platform of standard construction installed across the tops of adjacent boilers or pressure vessels or at some other convenient level for the purpose of affording safe access. All walkways shall have at least two (2) means of exit each to be remotely located from the other.

(15) Exit From Boiler Room. All boiler rooms exceeding five hundred (500) square feet floor area and containing one (1) or more boilers having a fuel burning capacity of one (1) million British thermal units per hour (BTU/hr), or equivalent electrical heat input, shall have at least two (2) means of exit. Each exit shall be remotely located from the other. Each operational elevation in the boiler room shall have two (2) means of exit, each remotely located from the other.

(16) Suggestions for Operations. It is suggested that the "Recommended Rules for Care of Power Boilers," Section VII and the "Recommended Rules for Care and Operation of Heating Boilers," Section VI of the ASME Code be used as a guide for proper and safe operating practices.

(17) Air Ventilation Requirements—Combustion Air Supply and Ventilation of Boiler Room. A permanent source of outside air

shall be provided for each boiler room to permit satisfactory combustion of the fuel as well as proper ventilation of the boiler room under normal operating conditions.

(A) The total requirements of the burners for all fired pressure vessels in the boiler room must be used to determine the louver sizes whether fired by coal, oil or gas, however, the minimum net free louvered area must not be less than one (1) square foot. The following table or formula shall be used to determine the net louvered area in square feet:

| Input (BTU/Hour) | Minimum Net Required Air (Cu/Ft/Min) | Louvered Area (Sq. Ft.) |
|---------------------|--|-------------------------------|
| 500,000 | 125 | 1.0 |
| 1,000,000 | 250 | 1.0 |
| 2,000,000 | 500 | 1.6 |
| 3,000,000 | 750 | 2.5 |
| 4,000,000 | 1000 | 3.3 |
| 5,000,000 | 1250 | 4.1 |
| 6,000,000 | 1500 | 5.0 |
| 7,000,000 | 1750 | 5.8 |
| 8,000,000 | 2000 | 6.6 |
| 9,000,000 | 2250 | 7.5 |
| 10,000,000 | 2500 | 8.3 |

$(BTUH \div 10,000) \times 2.5 = \text{CFM required}$
CFM required divided by 300 CFM per square foot equals the net area required.

(B) When mechanical ventilation is used in lieu of subsection (17)(A), the supply of combustion and ventilation air to the boiler room and the firing device shall be interlocked with the fan so the firing device will not operate with the fan off. The velocity of the air through the ventilating fan shall not exceed five hundred feet (500') per minute and the total air delivered shall be equal to or greater than shown in subsection (17)(A).

(18) Gas Burners. For installations which are gas fired, the burners used shall conform to the applicable requirements of the American Gas Association or other nationally recognized standards.

(19) Conditions Not Covered by These Regulations. For any conditions not covered by these requirements, the applicable provisions of the ASME Code, the National Board Inspection Code and API-510 shall apply.

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.*

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

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.

(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.*

**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 Variances

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.*

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.

(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.*