STATE OF KANSAS

BOILER SAFETY ACT

The Law, Rules and Regulations Governing
Boiler Construction, Installation, Inspection,
Maintenance and Repair of Boilers

Kansas State Fire Marshal
Boiler Inspection & Safety Unit

800 SW Jackson Suite 104
Topeka, Kansas 66612

Laura Kelly, Governor
State of Kansas

Mark Engholm, Fire Marshal
Kansas State Fire Marshal Office

UPDATED 2/2026

"For the preservation of safe boilers in Kansas
this vital and fundamental law
is hereby dedicated."

The following rules must be obeyed to insure the owner/user of any boiler or water heater are compliant with the rules and regulations of K.S.A. 44-913 et seq.

DO NOT: Install a secondhand boiler in this State without first obtaining permission from the Boiler Inspection & Safety Unit. A secondhand boiler is one that changes both ownership and location.

DO NOT: Re-install a boiler without a final inspection by an Authorized Inspector before placing boiler in service. A re-installed boiler is one that changes location only.

DO NOT: Allow any welding or cutting operation on the pressure parts of a boiler or pressure piping without the express consent of acceptance of an Authorized Inspector.

DO NOT: Fail to post operating certificate in room containing the boiler.

IN CASE OF AN ACCIDENT to a boiler which renders the boiler inoperative, the Owner, user or insurer shall notify the Boiler Inspection & Safety Unit immediately and submit a detailed report of the accident. In case of a serious accident such as an explosion with resultant property damage and/or personal injury, the notification to this department shall be immediate by telephone, email or personal contact. The damaged vessel nor any parts thereof shall be disturbed or removed unless to do so would save a human life.

NO BOILER which does not conform to these rules and regulations may be legally operated in this State.

REFER ALL COMMUNICATION TO:
Boiler Inspection & Safety Unit
Kansas State Fire Marshal
800 SW Jackson, Suite 104
Topeka, Kansas 66612
Phone - 785-296-4451
Boiler.inspection@ks.gov

TO EXPEDITE REPLIES concerning a particular installation, please refer to the Kansas Number (KS#) of the object.

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Article 45. --BOILER SPECIFICATIONS AND INSPECTIONS

49-45-1 Rules for construction for power boilers. Section I of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1, 1979; amended May 1, 1984; amended May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-45-1a Rules for construction of steam cleaners and hot waterpower washers

Each steam cleaner and each hot waterpower washer subject to this regulation shall meet the requirements in ‘‘High-Pressure Cleaning Machines,’’ UL 1776, third edition, published on April 1, 2022, by Underwriters Laboratories, Inc. and hereby adopted by reference, including the appendix. (Authorized by K.S.A. 44- 916; implementing K.S.A. 2005 Supp. 44-915; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-45-2 Part A: ferrous material specifications.
Section II, part A of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1, 1979; amended May 1, 1984; amended May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.

49-45-3 Part B-nonferrous material specifications.
Section II, part B of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1, 1979; amended May 1, 1984; amended May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-45-4 Part C-specifications for welding rods, electrodes, and filler metals. Section II, part C of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1, 1979; amended May 1, 1984; amended
May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-45-4a Part D-properties (customary). Section II, part D, ‘‘properties (customary)’’ of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective April 28, 2000; amended Nov. 3, 2006.)

49-45-4b Part D-Properties (metric). Section II, part D, ‘‘properties (metric)’’ of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective Nov. 3, 2006.)

49-45-5Rules for construction of heating boilers. Section IV of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1, 1979; amended May 1, 1984; amended May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-45-6 Nondestructive examination. Section V of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1,1979; amended May 1, 1984; amended May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-45-7 Recommended rules for the care and operation of heating boilers
Section VI of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1, 1979; amended May 1, 1984; amended May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-45-8 Recommended guidelines for the care of power boilers.
Section VII of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1, 1979; amended May 1, 1984; amended May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-45-9 Qualification standard for welding and brazing procedures, welders, brazing, and welding and brazing operators.
Section IX of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1, 1979; amended May 1, 1984; amended May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-45-10 to 49-45-19. (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1, 1979; amended May 1, 1984; amended May 1, 1987; revoked Nov. 22, 1996.)

49-45-20 National board inspection code (ANSI/ NB-23). The national board inspection code (NBIC), which consists of parts 1, 2, 3, and 4, 2025 edition, an American national standard, published by the National Board of Boiler and Pressure Vessel Inspectors, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective, E-79-27, Oct. 19, 1978; effective May 1,1979; amended May 1, 1984; amended May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006; amended Oct. 10, 2008.)

49-45-21 through 49-45-26. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1984; amended May 1, 1987; amended April 28, 2000; revoked Nov. 3, 2006.)

49-45-27 Controls and safety devices for automatically fired boilers. ASME CSD- 1, controls and safety devices for automatically fired boilers, 2024 edition, published July 2024 edition, and effective January 12026, is adopted by reference. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-45-28 Power piping ASME B31.1-2022, the American society of mechanical engineers (ASME) code for pressure piping, including the appendices, 2022 edition, is adopted by reference. (Authorized by and implementing K.S.A. 1998Supp. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006; amended Oct. 10, 2008.)

49-45-29 Rules for construction of pressure vessels; division 1 Section VIII, division 1 of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective April 28, 2000; amended Nov. 3, 2006; amended Oct. 10, 2008.)

49-45-29b Rules for construction of pressure vessels; division 2–alternative rules. section VIII, division 2 of the American society of mechanical engineers (ASME) boiler and pressure vessel code, an American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective April 28, 2000; revoked Nov. 3, 2006.)

49-45-30. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective April 28, 2000; revoked Nov. 3, 2006.)

49-45-31 Rules for construction of pressure vessels; division 3, alternative rules for construction of high-pressure vessels. Section VIII, division 3: of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and an American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective April 28, 2000; amended Nov. 3, 2006; amended Oct. 10, 2008.)

49-45-32 Uniform mechanical code. The uniform mechanical code, including the appendices, an international code and American national standard, 2021 edition, published November 2020, by the international association of plumbing and mechanical officials, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective April 28, 2000; amended Nov. 3, 2006.)

49-45-33 International plumbing code. The international plumbing code, an American national standard, 2021 edition, published February 2021, by the international conference of building officials, is hereby adopted by reference. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective April 28, 2000)

49-45-34 Fiber-reinforced plastic pressure vessels.
Section X of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective April 28, 2000; amended Nov. 3, 2006; amended Oct. 10, 2008.)

49-45-35 Rules for construction and continued service of transport tanks. Section XII of the American society of mechanical engineers (ASME) boiler and pressure vessel code, including the appendices, an international code and American national standard, 2025 edition, published July 1, 2025, is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective Nov. 3, 2006; amended Oct. 10, 2008.)

49-45-36. Uniform plumbing code. The following portions of the uniform plumbing code, an American national standard, 2024 edition, published by the international association of plumbing and mechanical officials, are hereby adopted by reference:
(a) Chapter 5.
(b) Chapter 6, except parts 603.4.6, 603.4.8, 603.4.10, 603.4.17, 603.4.18, 603.4.19, and 603.20.
(c) chapter 7.
(d) chapter 12; and
(e) appendices A and C and the applicable portions of appendix I. (Authorized by and implementing K.S.A. 44-916; effective Nov. 2, 2007.)49-45-36 Boiler and Combustion Systems Hazards Code.

49-45-37. Boiler and combustion systems hazards code. NFPA 85, ‘‘Boiler and Combustion Systems Hazards Code,’’ including the appendices, 2023 edition, published by the National Fire Protection Association (NFPA), is hereby adopted by reference. However, the following paragraphs are not adopted:
(a) 2.3.1.
(b) 2.3.3.
(c) 2.3.5.
(d) 2.3.6.
(e) 2.3.7; and
(F) 2.4. (Authorized by and implementing K.S.A. 44-916; effective Nov. 3, 2006.)

45-49-38 Standard for the prevention of furnace explosions in fuel oil- and natural gas-fired single burner boiler furnaces. NFPA 85A, “standard for the prevention of furnace explosions in fuel oil-and natural gas-fired single burner- furnaces,’’ including the appendices, 2021 edition, published by the national fire protection association (NFPA), is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective Nov. 3, 2006; amended Oct. 10, 2008.)

49-45-39 Rules for overpressure protection. The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XIII Rules for Over Pressure Protection, an

American National Standard, 2025 edition, published July 1, 2025, is adopted by reference.

Article 45a. –DEFINITIONS

49-45a-1 Definitions.

(a) ‘‘The act’’ means the Kansas Boiler Safety Act and regulations pertaining to the laws of boiler and pressure vessel safety.

(b) ‘‘Alteration’’ means any change in the item described on the original manufacturer’s data report that affects the pressure-containing capability of the boiler or pressure vessel. Each nonphysical change, including an increase in the maximum allowable internal or external working pressure or the design temperature of a boiler or pressure vessel, shall be considered an alteration. Any reduction in minimum temperature so that additional mechanical tests are required shall also be considered an alteration.

(c) ‘‘ANSI’’ means the American national standards institute.

(d) ‘‘ASME’’ means the American society of mechanical engineers.

(E) ‘‘Authorized inspection agency’’ means either of the following

(1) A department or division established by a government jurisdiction that has adopted one or more sections of the ASME code and whose chief inspector holds a valid commission issued by the national board of boiler and pressure vessel inspectors; or

(2) an inspection agency of an insurance company that is authorized to insure and is insuring boilers and pressure vessels in those jurisdictions that have examined the agency inspectors’ qualifications to represent that jurisdiction, resulting in the issuance of a valid certificate of competency to the inspector by the national board of boiler and pressure vessel inspectors.

(f) ‘‘BTUH’’ means British thermal units of heat per hour.

(f) ‘‘Chief inspector’’ means boiler supervisor of the Kansas Fire Marshal Office

(g) ‘‘Column, fluid relief’’ means piping that is connected from the top of a hot water heating boiler to either an open or a closed expansion tank, providing for the thermal expansion of water.

(h) ‘‘High pressure, high temperature water boiler’’ means a water boiler operating at pressures exceeding 160 pounds per square inch gauge or at a temperature exceeding 250°F.

(i) ‘‘High pressure power boiler’’ means a boiler in which steam or other vapor is generated at a pressure of more than 15 pounds per square inch gauge.

(j) ‘‘Hot water heating boiler’’ means 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 160 psig or a temperature of 250°F at or near the boiler outlet.

(L) ‘‘Hot water supply boiler’’ means a boiler completely filled with water that furnishes hot water, to be used externally, at pressures not exceeding 160 psig or at temperatures not exceeding 210°F at or near the boiler outlet.

(M) ‘‘Lap seam crack’’ means a crack found in lap seams extending parallel to the longitudinal joint and located either between or adjacent to rivet holes.

(n) ‘‘Low pressure heating boiler’’ means a steam or vapor boiler operating at pressures not exceeding 15 pounds per square inch gauge or a hot water boiler operating at pressures not exceeding 160 pounds per square inch gauge or at temperatures not exceeding 250°F.

(O) ‘‘Makeup water’’ means water introduced into the boiler to replace the water lost or

removed from the system.
(P) ‘‘National board’’ means the National board of boiler and pressure vessel inspectors, whose membership is composed of the chief inspectors of each jurisdiction charged with the administration and enforcement of the provisions of the ASME code.
(Q) ‘‘Nonstandard boiler’’ means a boiler that does not bear the ASME stamp or the stamp of any jurisdiction that has adopted a standard of construction equivalent to that required by these regulations.
(R)‘‘Owner or user’’ means any person, firm, or corporation subject to the provisions of the Kansas Boiler Safety Act and responsible for the safe operation of any boiler within this state.
(S) ‘‘PSIG’’ means pounds per square inch gauge.
(T)‘‘Reinstalled boiler’’ means a boiler removed from its original setting and reinstalled at the same location or at a new location without change of ownership.
(U) ‘‘Repair’’ means any work necessary to restore a boiler or pressure vessel to a safe and satisfactory operating condition without changing the original design, as defined in part RC of the National Board Inspection Code, which is adopted by reference in K.A.R. 49-45-20.
(V)‘‘Secondhand boiler’’ means a boiler that has changed both location and ownership since its initial use.
(W) “Fire Marshal” Means Kansas State Fire Marshal.
(X)‘‘Standard boiler’’ means a boiler that bears the ASME code symbol stamp or a stamp of another approved and recognized code of construction and that is registered with the National board of boiler and pressure vessel inspectors.
(Y)‘‘T&P safety relief valve’’ means the temperature and pressure safety relief valve designed for use on storage water heaters and hot water storage tanks. The temperature and pressure safety relief valve shall actuate upon pressure and in all instances at temperatures not exceeding 210°F.
(Z)‘‘Traction boiler’’ means a steam-powered traction engine mounted on wheels and capable of being self-propelled.
(aa) ‘‘Water gauge glass’’ means a glass-enclosed, visible indicator of the water level in a boiler. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-45a-2 to 49-45a-27. (Authorized by and implementing K.S.A. 1985 Supp. 44- 916; effective May 1, 1987; revoked April 28, 2000.)

Article 46. --BOILER INSURANCE AND ADMINISTRATION

49-46-1 Insurance company requirements.

(a) Each company insuring one or more boilers or pressure vessels located in this state shall perform an inspection, as prescribed in K.S.A. 44-923, and amendments thereto, or K.A.R. 49-48-1, of each boiler or pressure vessel insured by the company.

(b) If an insurance company fails or refuses to inspect a boiler or pressure vessel insured by that company, as required by K.S.A. 44-923(c), and amendments thereto, and subsection (a) of this regulation, the boiler or pressure vessel shall be required by the Kansas State Fire Marshal to be inspected by boiler supervisor, or a deputy inspector. The appropriate fee specified in K.S.A. 44-926, and amendments thereto, shall be charged for any inspection conducted under this subsection and shall be paid by the owner or user of the boiler or pressure vessel, or the insurance company that insures the boiler or pressure vessel.

(c) All insurance companies shall notify the boiler supervisor or designee immediately if insurance is suspended because of unsafe conditions.

(d) In the event that a boiler or pressure vessel water or fireside explosion or severe overheating occurs, the owner, user, insurance inspector, or emergency personnel shall

promptly notify the Kansas State Fire Marshal. Neither the boiler nor pressure vessel, or any parts of either, shall be removed or disturbed before permission has been given by the boiler supervisor or designee, except for the purpose of saving human life, limiting consequential damage, or arson investigation.

(e) For all accidents or incidents involving boilers or pressure vessels that cause property damage in excess of 10 percent of the boiler or pressure vessel's worth, serious injury, or death, the owner, user, insurance inspector, or emergency personnel shall promptly notify the boiler supervisor or designee. Neither the boiler nor pressure vessel, or any parts of either, shall be removed or disturbed
before permission has been given by the boiler supervisor or designee, except for the purpose of saving human life, limiting consequential damages, or conducting an arson investigation.

(f) Upon request by the boiler supervisor or designee, the insurance company shall submit within five days an accident or incident report to the boiler supervisor or designee.
(Authorized by K.S.A. 1999 Supp. 44-916; implementing
K.S.A. 1999 Supp. 44-920, 44-923; effective, E-81-38, Dec. 10, 1980; effective May 1, 1981; amended, T-83-41, Nov. 23, 1982; amended May 1, 1983; amended April 28, 2000.)

Article 47. –INSPECTORS

49-47-1 Requirements of special inspectors.

(a) All special inspectors commissioned by the Kansas State Fire Marshal pursuant to K.S.A 44-920, and amendments thereto, shall serve upon the owner or user, operator, or other person or persons having charge or care of a boiler or pressure vessel, a billing for the certificate required by K.S.A. 44-926(b), and amendments thereto. Billing forms shall be provided by the Kansas State Fire Marshal and shall provide a space for the signature of the person receiving the billing form. The special inspector shall notify the Kansas State Fire Marshal in the event that the inspector is unable to serve the billing.

(b) Each special inspector shall conduct a thorough inspection of the boilers and pressure vessels and all of the components in the system. The safety or safety relief valves shall be set no higher than the lowest maximum allowable working pressure (MAWP) of components in the system.

(c) Each special inspector shall note the housekeeping conditions in the boiler room. Equipment and flammable materials not related to the operation of the boilers or pressure vessels shall not be stored in the boiler or mechanical room.

(d) Each special inspector shall report any scrapped or out-of-service boilers or pressure vessels. Failure to report these units shall result in a charge back to the insurance company equal to an inspection fee, if the state boiler inspectors have to follow up on discontinued insurance or canceled policies. (Authorized by K.S.A. 1998 Supp. 44-916; implementing K.S.A. 1998 Supp. 44-920, 44-921; effective, E- 81-38, Dec. 10, 1980; effective May 1, 1981; amended April 28, 2000.)

49-47-1a Special inspector. Each inspector shall be registered with the state of Kansas and shall have a valid Kansas commission before performing any inspection, including in-service, repair or alteration, or work, in any ASME code shop in the state. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective April 28, 2000.)

49-47-1-b Organizations with special inspectors of antique and exhibition boilers.

(a) Any organization of antique engines, scale models, locomotives, and other boilers used

for exhibition purposes shall register annually its inspection procedures with the department for approval by the boiler supervisor or designee.

(b) (1) The organization shall register each special inspector with the Kansas Department of Human Resources, Office of the State Fire Marshal, and each special inspector shall be subject to periodic monitoring of procedures and inspection by the boiler supervisor or deputy inspectors. In order for the organization to register its special inspectors, the organization shall establish the following procedures:

(A) A qualifying exam on the type of equipment that will be inspected.

(B) establishment of different levels of competency among the special inspectors

(C)periodic training and exams to ensure each special inspector's level of competency; and

(D) Monitoring by other special inspectors within the organization to ensure competency

(2) The organization shall provide documentation that shows each special inspector meets the following criteria:

(A) Is experienced and receives periodic training on the type of equipment inspected

(B)inspects only vessels for which the inspector is qualified; and

© attains a score of at least 70% on the qualifying exam.

(3) The chief inspector shall make the final decision on who will receive special inspector cards from the state.

(c) The organization inspection procedures shall be subject to periodic monitoring by the boiler supervisor, or deputy inspectors. (Authorized by and implementing K.S.A. 1998 Supp. 44-915, 44-916, and 44-920; effective April 28, 2000.)

49-47-2 Application of state serial numbers.

(a) Upon completion of the installation of a new 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 or affixed with a one-inch by four-inch, corrosion-resistant metal tag with the serial number of the state, consisting of letters and figures to be not less than 5⁄16 inch in height and arranged as follows:

High Pressure KS 1,000 Low
Pressure KS 1,000 H
Pressure Vessels KS 1,000 U
Antique Hobby KS 1,000 A

(b) All cast iron and low-pressure heating boilers or pressure vessels shall have securely attached to the casing, water column, or gauge or other appliance of the boiler or pressure vessel, a corrosion resistant metal tag on which is stamped the serial number of the state. The tag shall be not less than one inch by four inches in size. (Authorized by K.S.A. 44-916; implementing K.S.A. 44-924; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

Article 48. --FREQUENCY OF INSPECTION

49-48-1 Certificate inspections; type and frequency. Certificate inspections shall be made pursuant to the following schedule: (a) Power boilers and high pressure, high temperature water boilers shall receive an annual certificate inspection that shall be an internal inspection where construction permits, or as complete an inspection as possible where construction does not permit

internal inspection. However, an external inspection may, at the discretion of the inspector, serve as a certificate inspection during the initial year of operation for any new boiler. These boilers shall also be externally inspected while under pressure, if possible, once a year. Upon written request by the owner or user of a power boiler or high pressure, high temperature water boiler, an extension may be granted by the secretary between internal inspections, not to exceed 24 months, with the external inspection on alternate years to be accepted as a certificate inspection, if all of the following conditions are met:

(1) Agreement is reached between the Kansas State Fire Marshal and the insurance company responsible for the inspection that an extension be granted.

(2) A continuous boiler water treatment program under competent supervision is in effect for the purpose of controlling and limiting corrosion and deposits on the waterside surfaces.

(3) Complete records are available showing the dates the boilers have been out of service, and the reason for this, since the last internal inspection. The records show the nature of any repair or repairs and the reasons for the repairs.

(4) The report of the last certificate inspection shows no reason why the boiler cannot be operated safely.

(b) Any indication of problems noted during the certificate inspection shall void any extension or written request for an extension and the boiler or pressure vessel shall be shut down and an internal inspection performed.

(c) Low pressure steam and hot water heating boilers, as defined by K.S.A. 44-914, and amendments thereto, shall receive an annual external certificate inspection, except that low pressure steam heating boilers, the construction of which allows internal inspection, shall receive an internal certificate inspection every three years.

(d) Low pressure hot water supply boilers of 120 gallons and over shall receive an external certificate inspection every three years. Low pressure hot water supply boilers over 400,000 BTUH shall receive an external certificate inspection annually.

(e) Upon written request of an insurance company and with the agreement of the owner or user of a boiler, the period of validity of a certificate may be extended by the State Fire Marshal for a period not to exceed two months.

(f) Each pressure vessel measuring 15 or more cubic feet shall receive a certificate inspection upon installation or replacement of each vessel in new and existing installations.

(g) All sizes of swimming pool heaters shall be subject to an external certificate inspection every three years. However, pool heaters of 400,000 BTUH and over shall be inspected annually.

(h) Each steam kettle and steam chef shall receive an annual certificate inspection.

(i) Each autoclave shall receive an annual certificate inspection, if it has a steam generator attached to the system or if the autoclave is a part of the system.

(j) Each waste heat boiler constructed to the requirements of section I of the ASME code shall receive an annual internal certificate inspection.

(k) Each waste heat boiler constructed to the requirements of section VIII of the ASME code shall receive an external certificate inspection every year, and, if construction permits, this boiler shall receive an internal inspection every three years, unless operating conditions warrant a more frequent inspection.

(l) Each steam generator that meets any of the following conditions shall receive an annual inspection:

(1) Produces steam for any process

(2) is fitted with safety valves installed at the factory; or

(3) is modified in the field to require safety valves. (Authorized by and implementingK.S.A.1998 Supp. 44-916; implementing K.S.A. 1998 Supp. 44-923; effective, E-81-38, Dec. 10, 1980; effective May 1, 1981; amend, T-83-41, Nov. 23, 1982; amended May 1, 1983; amended April 28, 2000.)

Article 49. —FEE SCHEDULE FOR BOILER INSPECTIONS

49-49-1. Boiler inspection and certificate fees. (a) inspection fees.

(1) Internal inspections of power boilers and high-pressure, high temperature water boilers:	
Mini-Boilers	$ 50.00
Boilers with 50 sq. ft. of heating surface or less	$115.00
Boilers with more than 50 sq ft of heating surface, but less than500sq.ft of heating surface	$140.00
Boilers with 500 sq. ft. of heating surface or more, but less than 4,000 sq. ft. of heating surface.	$150.00
Boilers with 4,000 sq. ft. of heating surface or more, but less than 8,000 sq ft. of heating surface	$175.00
Boilers with 8,000 sq. ft. of heating surface or more, but less than 10,000 sq. ft. of heating surface	$200.00
Boilers with 10,000 sq. ft. of heating surface or more	$400.00
(2) Internal Inspections of Heating Boilers:	
Heating boilers without a manhole	$85.00
Heating boilers with a manhole	$100.00
(3) External Inspections of Heating Boilers:	
Heating boilers without a manhole	$60.00
Heating boilers with a manhole	$75.00
Hot water supply boilers	$50.00
(4) External Inspections of Power Boilers:	
Boilers with 50 sq. ft. of heating surface or less	$55.00
Boilers with more than 50 sq. ft. of heating surface, but less than 500 sq. ft. of heating surface	$65.00
Boilers with 500 sq. ft. of heating surface or more, but less than 1,000 sq. ft. of heating surface	$90.00
Boilers with 1,000 sq. ft. of heating surface or more, but less than 4,000 sq. ft. of heating surface	$175.00
Boilers with 4,000 sq. ft. of heating surface or more, but less than 8,000 sq. ft. of heating surface	$225.00
Boilers with 8,000 sq. ft of heating surface or more, but less than 10,000 sq. ft. of heating surface	$300.00
Boilers with 10,000 sq. ft. of heating surface or more	$400.00

(5) Hydrostatic Tests. If it is necessary for an inspector to make a trip in addition to the inspector's routine, regularly scheduled trips in order to witness the application of a hydrostatic test, a fee shall be charged based on the scale of fees applicable to the issuance of a certificate of inspection of the boiler, as set out in paragraphs (a) (1) through (a)(4) of this regulation.

(6) The fee for all inspections performed by the Boiler Supervisor or deputy inspector, including shop inspections, shop reviews, inspections performed at the request of the boiler operator, inspections conducted due to a determination that a boiler operator is not operating in compliance with boiler operation regulations, and inspections of secondhand or used boilers, shall be $500.00 per day. If a state boiler inspector participates in a national board "R" stamp review conducted by the national board of boiler and pressure vessel inspectors or if a state boiler inspector inspects welded repairs to a boiler, the fee shall be $1000.00 per day.

(B)Certificate fee.

1. The certificate of inspection fee shall be $35.00.

(Authorized by and implementing K.S.A. 2004 Supp. 44-926; effective, T-83-41, Nov. 23, 1982; effective May 1, 1983; amended May 1, 1984; amended May 1, 1987; amended, T-88-41, Oct. 24, 1987; amended May 1, 1988; amended June 25, 1990; amended July 18, 1997; amended Jan. 27, 2006.)

49-49-1a Pressure vessel inspection fees.

(a) External Inspections of Pressure Vessels:

Pressure vessels with a capacity of less than 500 gallons	$55.00
Pressure vessels with a capacity of 500 gallons or more, but less than 2,000 gallons	$65.00
Pressure vessels with a capacity of 2,000 gallons, but less than 5,000 gallons	$75.00
Pressure vessels with a capacity of 5,000 gallons, but less than 10,000 gallons	$90.00
Pressure vessels with a capacity of 10,000 gallons, but less than 20,000 gallons	$125.00
Pressure vessels with a capacity of 20,000 gallons, but less than 30,000 gallons	$175.00
Pressure vessels with a capacity of 30,000 gallons, but less than 50,000 gallons	$225.00
Pressure vessels with a capacity of 50,000 gallons and over	$275.00

(b) Internal Inspections of Pressure Vessels:

Pressure vessels with a capacity of less than 500 gallons	$75.00
Pressure vessels with a capacity of 500 gallons, but less than 2,000 gallons	$90.00
Pressure vessels with a capacity of 2,000 gallons, but less than 5,000 gallons	$125.00
Pressure vessels with a capacity of 5,000 gallons, but less than 10,000 gallons	$175.00
Pressure vessels with at least 10,000-gallon, but less than 20,000-gallon, capacity	$250.00
Pressure vessels with a capacity of 20,000 gallons, but less than 30,000 gallons	$325.00
Pressure vessels with a capacity of 30,000 gallons, but less than 50,000 gallons	$350.00
Pressure vessels with a capacity of 50,000 gallons and over	$400.00

(Authorized by and implementing K.S.A. 2004 Supp. 44-926; effective April 28, 2000; amended Jan. 27, 2006.)

49-49-2. Failure to pay fees. (a) An inspection certificate shall not be issued or a certificate issued at the time of inspection shall be cancelled if the owner or user fails to pay the proper inspection fee.

(c) The appropriate county or district attorney shall be notified by the secretary of any boiler that is operated in violation of the act. (Authorized by K.S.A. 1985 Supp. 44-916; implementing K.S.A. 44-925; effective May 1, 1987.)

Article 50. --GENERAL REQUIREMENTS FOR ALL BOILERS

49-50-1 Major repair to boilers and pressure vessels.

(a) Boiler and pressure vessel repairs or alterations shall be made so that each boiler or pressure vessel conforms to the original code of construction used for the pressure-retaining item whenever possible. Any repairs or alterations not covered by this regulation shall be subject to the requirements for new construction.

(B) Welding.

(1) Repairs or alterations by fusion welding shall be approved by an authorized inspector before beginning the work. All welding repairs or alterations shall be made in accordance with the appropriate section of Part 3 Repairs and Alterations, of the National Board Inspection Code.

(2) All welding shall be done by either of the following:

(A) An organization holding the applicable ASME certificate of authorization or the national board "R" or "NR" stamp; or

(B) an owner or user, who has demonstrated to the satisfaction of the Boiler Supervisor or designee, all of the following:

(i)The owner or user maintains an acceptable quality control system.

(i) Welding work completed by the owner or user is in compliance with ASME Section IX, Qualification Standard for Welding Brazing and Fusion Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators.

(ii) Before the welding operations, the owner or user has assured that all welders are qualified by compliance with ASME standards.

(iii) The owner or user has notified the applicable insurance company boiler inspector or state boiler inspector before doing any welding. The organization performing the repair shall be responsible for filing the national board's repair or alteration form with the Kansas Office of the State Fire Marshal Boiler Supervisor.

(b) Each welder or welding operator shall qualify for each welding process used in the repair or alteration of a boiler or pressure vessel. The qualifications for welders shall be those established in section IX of the ASME Code, and by a qualified welding procedure specification of the organization making the repair or alteration.

(c) Each organization making repairs or alterations under this regulation shall list the parameters applicable to welding that are to be performed in the welding procedure specification (WPS) documents. The documents shall have been qualified by the organization as required by the applicable section of the ASME Code. The organization shall qualify its WPS by the welding of test coupons, the testing of specimens, and recording the welding data and test results in its procedure qualification record (PQR) document.

(e)(1) The organization making the repair or alteration shall adopt specific procedures for performing welding operations in the shop or the field. The procedure specification shall comply with the requirements of section IX of the ASME code and the national board Inspection code.

(2) The procedure specifications shall be written and shall provide all pertinent details about

the methods and procedure to be used, including the following:

(A) The type of electrode or rod to be used the shape of the welding groove

(B) the number and sequence of the beads

(C) the manner in which slag is to be cleaned

(D) peening and current characteristics, if electric welding; and

(E) if gas welding, the size of the tip, the nature of the flame, and the designation of forehand or backhand technique used.

(3) The procedure specification shall ensure that weld metal and welded joints comply with the characteristics required by section IX of the ASME code and the national board inspection code.

(4) A test demonstrating the sufficiency of the procedure specification shall be witnessed by the inspector, or authentic evidence documenting the sufficiency of the specifications shall be provided to the inspector.

(F) The material used for patches shall be of the same general quality, shall have, at least, the minimum physical properties of the plate to be patched and shall be traceable. The thickness of any patch shall be at least equal to, but not more than, 1/8 inch greater than the plate being patched. Flush or butt-welded patches in unstayed shells, drums, or headers shall be radiographed and stress-relieved to conform to the requirements of the national board inspection code, part 3 2021 edition. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-50-2 Combustion air supply and ventilation of boiler room. (a) 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. One opening shall be 12 inches above floor level, and one opening shall be 12 inches below ceiling level. The opening 12 inches below ceiling level shall be at least 1/3 of the area of the lower opening. The size of the lower opening shall not be less than is required in subsection (b) below, or as required in NFPA 31, 2020 edition, and NFPA 54, 2021 edition, both of which are hereby adopted by reference.

(b) The total requirements of the burners in the boiler room shall be used to determine the louver sizes, whether fired by coal, oil, or gas. However, the minimum net free-louvered area of the lower opening shall not be less than one square foot. The following table or either of the following formulas shall be used to determine the net louvered area of the lower opening in square feet, or as required in NFPA 31 and NFPA 54:

MIN. NET INPUT BTU/Hour	REQUIRED CU. FT./MIN.	AIR 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	1,000	3.3
5,000,000	1,250	4.1
6,000,000	1,500	5.0
7,000,000	1,750	5.8
8,000,000	2,000	6.6
9,000,000	2,250	7.5

10,000,000	2,500	8.3

$$\frac{\text{(BTUH} \div 100) \times 1.5 \text{ MIN. NET AREA}}{60 \div 300 \text{ REQ. SQ. Ft.}}$$

(c) When mechanical ventilation is used in lieu of the requirements of subsection (b), the supply of combustion and ventilation air to the boiler room and the firing device shall be interlocked with the fan so that the firing device will not operate with the fan off. The velocity of the air through the ventilating fan shall not exceed 500 feet per minute, and the total air delivered shall be equal to or greater than that shown in subsection (b) above. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-50-3 Boiler combustion chamber vents.
Each boiler shall be equipped with vents to convey the products of combustion safely from the boiler furnace to the outside atmosphere. Flue piping, draft hoods, draft diverters, and chimney connections shall be installed according to the boiler manufacturer's instructions and the provisions of the national fire protection codes, NFPA 31, ''standard for the installation of oil-burning equipment,'' and NFPA 54, ''national fuel gas code,'' as adopted by reference in K.A.R. 49-50-2. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-50-4 Cross-connection control.
(a) A person shall not install any water-operated equipment or mechanism, or use any water-treating chemical or substance, if it is found that this equipment, mechanism, chemical, or substance may cause pollution of the domestic water supply. The equipment or mechanism may be permitted only when equipped with an approved backflow prevention device.

(b) Each backflow prevention device installed in a potable water supply system shall be maintained in good working condition by the person or persons having control of the device. The devices may be inspected by authorized inspectors and, if found to be defective or inoperative, shall be repaired or replaced as directed by the inspector. A device shall not be removed from use or relocated or another device substituted without formal notification to the office of the responsible authorized inspection agency.

(c) Potable water piping shall not be installed or maintained within any piping or device conveying sewage, wastes, or other materials hazardous to health and safety.

(d) Each hot water heating and steam boiler connection shall be protected by an approved backflow prevention device as set forth in subsection (e) of this regulation and shall be tested and inspected by a qualified inspector.

(e) Non-Potable water piping. If it is impractical to correct individual cross- connections on the domestic water line, the line supplying these outlets shall be considered a non-potable water line. Drinking or domestic water outlets shall not be connected to the non-potable water line. Backflow or back-siphonage from the non-potable water line into the domestic water line shall be prevented by the installation of a gravity tank or by a tank having a pump designated for non-potable water. The domestic water inlets to the non-potable water tank shall have an approved air gap as specified within the ASME Code and the International Plumbing Code. Whenever it is impractical to install this tank, an approved pressure-type backflow or back-siphonage prevention device shall be installed as follows:

(1) If reverse flow is possible only as a result of gravity or a vacuum within the line, an approved pressure-type vacuum breaker unit or other approved backflow prevention device shall be installed in the supply line.

(2) Each pressure-type vacuum breaker unit shall be installed at a height of at least 12 inches

(.3m) above the highest tank, equipment, or other point at which the non-potable water is used. Other approved backflow prevention devices shall be installed in a manner satisfactory to the responsible authorized inspection agency, but in no case less than 12 inches (.3m) above the surrounding ground or floor.

(3) If backflow can occur, creating a higher pressure in the non-potable water line, an approved backflow prevention device shall be installed in the supply line. The backflow prevention device shall be installed at least 12 inches (.3m) above the surrounding ground or floor, no higher than five feet above the floor or surrounding ground, unless a work platform and ladder are provided.

(f) Whenever possible, all portions of the non-potable water line shall be exposed, and all exposed portions shall be properly identified in a manner satisfactory to the responsible authorized inspection agency. Each outlet on the non-potable water line that could be used for drinking or domestic purposes shall be posted with the following sign: DANGER-WATER UNSAFE.

(g) An approved backflow prevention device shall conform to the requirements of the American society of sanitary engineering (ASSE) publication 1013, as revised October 2021, and the American water works association (AWWA) publication C511-97, effective February 1, 2021, which are hereby adopted by reference. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-50-5. Excessive water pressure control for hot water supply systems.

When local water pressure is in excess of 80 pounds per square inch (55.2kPa), an approved pressure-type regulator preceded by an adequate strainer shall be installed and the pressure shall be reduced to 80 pounds per square inch (55.2kPa) or less. Potable water systems, up to and including 1½ inch (31.1mm) regulators, shall be constructed to prevent pressure, on the building side of the regulator, from exceeding the main supply pressure. Approved regulators with integral bypasses shall be acceptable. Each regulator and strainer shall be in an accessible location. The strainer shall be readily accessible for cleaning without removing the regulator or strainer body or disconnecting the supply piping. All pipe size determinations shall be based on 80 percent of the reduced pressure. (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987.)

49-50-6 Hydrostatic pressure tests and inspection.

(a) When there is doubt as to the extent of a defect or deterioration found in a pressure vessel, a pressure test may be required by the inspector. A pressure test shall not be required as part of a normal periodic inspection. A test shall be required when either of the following conditions is met:

(1) Forms of deterioration are found that could affect the safety of a vessel,

(2) Major repairs have been completed.

(b) Pressure test considerations shall be as follows:

(1) To determine tightness, the test pressure shall not be required to be greater than the set pressure of the safety valve having the lowest setting.

(2) The pressure test shall not exceed 1 1/2 times the maximum allowable working pressure, as adjusted for temperature. When the original test pressure included consideration of corrosion allowance, the test pressure may be further adjusted based on the remaining corrosion allowance and other requirements set forth in NBIC, part III, 2025 edition, as in effect on January 1, 2026.

(3) If the test pressure will exceed the set pressure of the safety valve having the lowest setting, the safety relief valve or valves shall be removed during the test,
or each disc held down by means of a test clamp and not by applying additional load to the valve spring by turning the compression screw.

(4) The temperature of the water used to apply a hydrostatic test shall not be less than 60° F

unless the owner provides information on the toughness characteristics of the vessel material to indicate the acceptability of a lower test temperature. The metal temperature shall not exceed 120° F unless the owner specifies the requirements for a higher test temperature acceptable to the inspector.

(5) When contamination of the vessel contents by any other medium is prohibited or when a hydrostatic test is not possible, other testing media may be used if the precautionary requirements of the applicable sections of the ASME code and national board inspection code (NBIC), as adopted in these regulations, are followed. In these cases, there shall be agreement as to the testing procedure among the owner, repair organization, the inspector, and the boiler supervisor.

(c) Each boiler log, record of maintenance, corrosion rate record, or any other examination results shall be reviewed by the inspector. The owner or user shall consult with the inspector regarding repairs, if any, made since the last internal inspection. Records of the repairs shall be reviewed for compliance with applicable requirements.

(d) Conclusions: Any defects or deficiencies in condition, maintenance practices, or misuse of the boiler shall be discussed by the inspector and owner, and, if necessary, corrective action shall be taken by the owner. All repairs shall be carried out in accordance with the requirements of Part III of the NBIC. (Authorized by K.S.A. 1999 Supp. 44-916; implementing K.S.A. 1999 Supp. 44-916 and 44-923; effective May 1, 1987; amended April 28, 2000; amended Nov. 2, 2007.)

49-50-7 Boiler blow-off equipment; general requirements.

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

(b) The temperature of the water leaving the blowoff equipment shall not exceed 140°F.

(c) The pressure of the blowdown leaving any type of blowoff equipment shall not exceed 5 psig.

(d) The blowoff piping and fitting between the boiler and boilers and the blowoff tank or tanks shall meet the requirements of paragraphs PG-58 and PG-59 of the ASME boiler and pressure vessel code, section I, which is adopted in K.A.R. 49-45-1. Blowdown piping shall not be galvanized.

(e) All blowoff tank construction shall meet the requirements of the ASME pressure vessel code, section VIII, division 1, as adopted in K.A.R. 49-45-29, and all materials used in the fabrication of boiler blowoff equipment shall meet the requirements of section II of the ASME boiler and pressure vessel code, as adopted in K.A.R. 49-45-2, K.A.R. 49-45-3, K.A.R. 49-45-4, and K.A.R. 49-45-4a.

(f) When a steam separator is used, it shall be designed to withstand at least twice the operating pressure of the boiler. The steam separator shall be equipped with a vent, an inlet and outlet, and a pressure gauge.

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

(h) In addition to meeting the other requirements in these regulations, all blowoff equipment shall meet the requirements in ‘‘a guide for blowoff vessels,’’ as published by the national board of boiler and pressure vessel inspectors and adopted by reference in K.A.R. 49-51-11, a copy of which may be obtained from the national board of boiler and pressure vessel inspectors or from the chief inspector. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-50-8 Piping system.

(a) Piping connected to the outlet of a boiler shall be attached by one of the following

methods:

(1) Screwing into a tapped opening with a screwed fitting or a valve at the other end;

(2) screwing each end into tapered flanges, fittings, or valves with or without rolling or peening;

(3) bolted joints, including those of the van stone type; or

(3) expanding into grooved holes, seal welded, if desired.

(b) Pipe that is expanded, rolled, or peened shall be made from open-hearth or electric-furnace steel. Blowoff piping of fire-tube boilers that is exposed to products of combustion shall be attached by the method in paragraph (a)(1). The attachment methods in paragraphs (a)(2), (3), or (4) may be used for blowoff piping of fire-tube boilers that is not exposed to combustion products. Fusion welding may be used for sealing purposes at the junction of bolted joints.

(c) Welding may be used to attach piping to nozzles or fittings if the rules adopted for fusion welding or forge welding at K.A.R. 49-50-1(b)(1) are followed. All welded piping that is external to the boiler, from the boiler out to the first stop valve, in a single installation, and out to the second stop valve when two or more boilers with manholes are connected to a common steam or high temperature water main or header, shall be installed by a manufacturer or contractor authorized to use any one of the American society of mechanical engineers code symbol stamps for pressure piping ("PP"), power boilers ("S"), or assembly stamp ("A"). The piping or fittings that are adjacent to the welded joint farthest from the boiler shall be stamped with the pressure piping, power boiler, or assembly code symbol stamp of the American Society of Mechanical Engineers when approved by the inspector.

(d) Power boiler piping shall be inspected in all segments of the system carrying substantially the same pressures and temperature encountered in the boiler. The piping shall be inspected to the extent necessary to assure compliance with engineering design, material specifications, fabrication, assembly, and test requirements of section I of the ASME boiler and pressure vessel code, "rules for construction of power boilers," for the piping between the boiler and the first stop valve in a single boiler installation, or the second stop valve in a multiple boiler installation. Power piping and piping beyond these limits shall be installed as required by the appropriate section of ASME B31.1 power piping.

(e) When welded assembly is used, the contractor who welded the pipe shall present welding procedure specification and proof of the welder's qualifications to the inspector for review. The contractor shall be responsible for the quality of the welding performed by the contractor's organization.

(f) Visual inspection of welding performed by qualified welders shall be deemed sufficient unless codes or engineering specifications state otherwise or unless the inspector wishes to augment this visual inspection with other non-destructive tests, including radiography. All tests or retests required by the inspector shall be at the owner's or contractor's expense.

(g) Signed certification of the contractor regarding satisfactory hydrostatic tests performed on piping may be accepted by the inspector. These tests may be required by the inspector to be performed in the inspector's presence.

(h) Heating boiler piping shall be inspected in all segments of the piping system carrying substantially the same pressure and temperatures as the boiler. The piping shall be inspected to the extent necessary to insure good fit-up, assembly, tightness, and support of the system. Welded joints shall be visually inspected for soundness of the weld and freedom from undercutting, cracking, and other surface imperfections. All inspections of piping shall be conducted to the first stop valve on a single boiler installation or the second stop valve in a multiple boiler installation.

(i) Hot water supply boiler installations shall be inspected for conformance with Section IV of the ASME heating boiler code. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-50-9 Notification of inspection requirements.

(a) A certificate inspection shall be carried out before the expiration date of the certificate. Each owner or user shall ensure that the boiler or pressure vessel is inspected on or before the date on which the inspection is due. Internal certificate inspections shall be scheduled in advance by the inspector. External inspections may be performed by the inspector during normal business hours without prior notification to the owner or user.

(b) An internal inspection, appropriate pressure test, or both may be requested by the inspector when an external inspection or determination by other objective means indicates that continued operation of the boiler constitutes a menace to public safety. In these instances, the owner or user shall prepare the boiler for the inspections, tests, or both as the inspector designates.

(c) All boilers and pressure vessels that are not exempted by the act and that are subject to regular inspections shall be prepared for inspection as required in subsection (d).

(d) The owner or user shall prepare each boiler for inspection. The owner or user shall prepare for and apply a hydrostatic pressure test on the date arranged by the inspector. The date shall not be fewer than seven days after the date of notification. The owner or user shall prepare a boiler for internal inspection in the following manner:

(1) Water shall be drawn off, and the boiler shall be washed thoroughly.

(2) The manhole and hand-hole 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.

(4) The 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.

(5) The pressure gauge shall be removed for testing, as required by the inspector.

(6) The leakage of steam or hot water into the boiler shall be prevented by disconnecting the pipe or valve at the most convenient point or by any other appropriate means approved by the inspector.

(7) The non-return and steam stop valves shall be closed, tagged, and preferably padlocked, and the valves drained or the cocks between the two valves opened. 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 feed valves shall be closed, tagged, and preferably padlocked, and the valves drained, or the cocks located between the two valves opened. After draining the boiler, the blow-off valves shall be closed, tagged and preferably padlocked. Blow-off lines, where practicable, shall be disconnected between pressure parts and valves. All drains and vent lines shall be opened.

(e) If a boiler has not been properly prepared for an internal inspection or if the owner or user has failed to comply with the requirements for a pressure test as specified in these regulations, the inspection or test may be postponed, and the inspection certificate shall be withheld or the right to operate revoked until the owner or user complies with the requirements.

(f) If the boiler is jacketed so that the longitudinal seams of shells, drums, or domes cannot be seen, sufficient jacketing, setting wall, or other form of casting 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, if this information cannot be determined by other means.

(g) If a lap seam crack is discovered along a longitudinal riveted joint in the shell or drum of a

boiler, the use of that shell or drum shall be immediately discontinued. Patching shall be prohibited.

(h) All lock-out, tag-out, and confined space entry procedures shall be observed. (Authorized by K.S.A. 44-916; implementing K.S.A. 44-916 and 44-923; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-50-10 Safety valve repair. (a) All national board capacity-certified ASME code section I, ‘‘V’’ stamped safety and safety relief valves and section VIII ‘‘UV’’ safety relief valves, in addition to all other coded piping systems using code-constructed safety and safety relief valves, shall be repaired in accordance with the national board of boiler and pressure vessel inspectors ‘‘VR’’ program specified in NBIC ANSI/NB-23, which is adopted by reference to K.A.R. 49-45-20. Each repair shall be performed by an organization in possession of a ‘‘VR’’ certificate of authorization issued by the national board of boiler and pressure vessel inspectors.

(b) Repair of a safety valve or safety relief valve shall be considered to be the replacement, re-machining, or cleaning of any critical part, lapping of the seat and disc, or any other operation that could affect the flow pressure, capacity, function, or pressure-retaining integrity of the valve. Disassembly and either reassembly or adjustments, or both, that affect the safety valve or safety relief valve function shall be considered repairs.

(c) The initial installation, testing, and adjustments of a new safety valve or a safety relief valve on a boiler or pressure vessel shall not be considered a repair if made by the manufacturer or assembler of the valve.

(d) Each valve intended for steam services shall be tested on steam. Each valve intended for air or gas service shall be tested on air or gas. All ASME code section IV ‘‘HV’’ and ‘‘V’’ stamped safety valves and relief valves designed for use on low pressure boilers shall be repaired only by the original manufacturer. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-50-11 Condemned boilers and pressure vessels.
Any boiler or pressure vessel that is inspected and declared unfit for further service by the boiler supervisor or deputy inspector shall be stamped by the inspector with an arrowhead stamp having an overall length of 1/2 inch and width of 3/8 inch on either side of the letters “XXX” and the letters of the state, as shown by the following facsimile: XXX KXXX. Each condemned boiler or pressure vessel shall be immediately taken out of service by shutting off the boiler's or pressure vessel's source of energy, followed by total disconnection of gas, electrical, and system piping. Any person, firm, partnership, or corporation installing or using a condemned boiler or pressure vessel within this state shall be subject to the penalties provided by K.S.A. 44-925, and amendments thereto. (Authorized by K.S.A. 1998 Supp. 44-916; implementing K.S.A. 1998 Supp. 44-925; effective May 1, 1987; amended April 28, 2000.)

49-50-12 Reinstalled boiler or pressure vessel. When a stationary boiler or pressure vessel is moved and reinstalled, it shall be brought up to code and shall be subject to immediate certification inspection upon reinstallation. The owner, user, or installer shall notify the Kansas Office of the State Fire Marshal of the reinstallation. However, a pressure vessel shall not require inspection if moved to a different location or reinstalled by the same owner at the same address listed on the certificate. (Authorized by K.S.A. 1998 Supp. 44-916; implementing K.S.A. 1998 Supp. 44-917; effective May 1, 1987; amended April 28, 2000.)

49-50-13 Reinstalled boiler or pressure vessel at same location. If a boiler or pressure vessel located in this state is moved for temporary use or repair, it shall be subject to immediate certification inspection upon reinstallation. The reinstalled boiler or pressure vessel shall be brought up to the current code requirements. The boiler or pressure vessel shall have a certification inspection if the boiler or pressure vessel has not been

previously registered. The owner, user, or installer shall notify the Kansas Office of the State Fire Marshal of the reinstallation. (Authorized by K.S.A. 44-916; implementing K.S.A. 44-917; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-50-14 Shipment of nonstandard boilers or pressure vessels into the state. Shipment of nonstandard, nonexempt boilers or pressure vessels into this state for use shall be prohibited unless a variance and an operating permit have been granted by the Kansas Office of the State Fire Marshal or the designee. (Authorized by K.S.A. 1998 Supp. 44-916; implementing K.S.A. 1998 Supp. 44-917; effective May 1, 1987; amended April 28, 2000.)

49-50-15 Installation of used or secondhand boilers or pressure vessels. A used secondhand boiler or pressure vessel may be shipped for installation in this state only following an inspection by an inspector qualified by an examination equal to that required by this state or by an inspector holding a national board commission, at the location where originally installed. Data submitted by the inspector shall be filed by the owner, user, or installer of the boiler with the Office of the State Fire Marshal of this state, for the boiler supervisor or deputy inspector's approval. The boilers or pressure vessels, when installed in the state, shall be subject to inspection by the boiler supervisor or deputy inspector and shall meet current safety codes as set forth in these regulations. (Authorized by amended Nov. 2, 2007.) K.S.A. 1998 Supp. 44-916; implementing K.S.A. 1998 Supp. 44-923; effective May 1, 1987; amended April 28, 2000.)

49-50-16. Working pressure for existing installations. (a) The working pressure on any existing installation may be decreased by the inspector if the boiler condition warrants it. (b) If the owner or user does not concur with the inspector's decision, the owner or user may appeal to the ~~secretary~~ State Fire Marshal who may request a joint inspection by the boiler supervisor and the deputy inspector or special inspector. Each inspector shall render a report to the Fire Marshal or designee. The Fire Marshal or designee shall render the final decision, based upon the data contained in the inspector's reports. (Authorized by K.S.A. 1985 Supp. 44-916; implementing K.S.A. 1985 Supp. 44-916 and K.S.A. 44-928; effective May 1, 1987.)

49-50-17 Steam cleaners or hot waterpower washers. (a) Each steam cleaner or hot waterpower washer in which water can flash into steam when released directly to the atmosphere through a manually operated nozzle, on which adequate controls and safety devices are installed, and on which safety relief valves are installed shall be subject to the boiler safety act if the cleaner or washer exceeds any of the limitations or conditions:

(A)The outside diameter of the tubing does not exceed one inch.

(B)There is no drum, header, or other steam space attached.

© The pipe size does not exceed national standard pipe (NSP) 3/4 inch.

(D)No steam is generated in the coil.

€ Normal water capacity does not exceed six gallons.

(F)Water temperature does not exceed 350° Fahrenheit.

(b)Each steam cleaner and each hot waterpower washer subject to this regulation shall meet the requirements in ''high-pressure cleaning machines,'' UL 1776, Third edition, published on April 1, 2022, by underwriters' laboratories, inc., and hereby adopted by reference, including the appendix. (Authorized by K.S.A. 44-916; implementing K.S.A. 2005 Supp. 44-915; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-50-18 Minimum construction standards for all boilers and pressure vessels.

(a) Each new boiler or pressure vessel installed for operation in this state, unless otherwise, exempt, shall be designed, constructed, inspected, stamped, and installed in

accordance with the applicable ASME code and addenda thereto and these regulations. Each boiler or pressure vessel shall bear the manufacturer's NB number as registered with the national board. A copy of the manufacturer's data report, signed by the manufacturer's representative and the national board commissioned inspector, shall be filed with the Kansas State Fire Marshal through the national board of boiler and pressure vessel inspectors.

(b) Variance. If a boiler or pressure vessel cannot bear the ASME and national board stamping, details of the proposed construction material specifications and calculations shall be submitted to the Kansas State Fire Marshal by the owner and user, and approval as a variance shall be obtained before construction is started. Design drawings and calculations shall be certified by a professional engineer currently registered in the state of Kansas. The boiler or pressure vessel shall be constructed and inspected as required by the national board inspection code (NBIC). (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-50-19 Combustion safeguards and waterside control appurtenances.

(a) Each automatically fired boiler shall be protected against the perils of low water, furnace explosion, overpressure, and over temperature by equipping the boiler with controls and safety devices in accordance with the requirements of ASME CSD-1. ASME CSD-1 and the national board inspection code, which are adopted by reference in K.A.R. 49-45-27 and K.A.R. 49-45-20, shall apply to new installations, used or secondhand boilers, boilers moved and relocated, retrofitting of any boiler system having experienced incidental failure of its control equipment, major alterations of existing installations, and any boiler that could lack controls and safety devices.

(b) To implement the provisions of ASME CSD-1 and the national board inspection code, manufacturers of new boilers shall provide documentation to installing contractors verifying that the boiler was constructed in compliance with CSD-1, Part CG-510. The testing and maintenance instructions obtained by the installing contractor and presented to the boiler owner or user shall be filed with the installation report and made available to the inspector upon request.

(c) Combustion and waterside controls and safety devices for boilers with burner inputs that exceed the 12,500,000 BTUH input limit of CSD-1 shall meet the requirements of all applicable ASME and NFPA standards and the national board inspection code, as adopted by reference in these regulations. Applicable flame safeguard requirements for the prevention of furnace explosions shall be those set forth in the national fire code, sections 85, 85A, 85F, and 86, which are adopted by reference in K.A.R. 49-45-37, K.A.R. 49-45-38, K.A.R. 45-49-39, and K.A.R. 49-45-40. Combustion and waterside controls and safety devices for existing boiler installations with burner inputs that exceed the 12,500,000 BTUH limit of CSD-1 shall meet the applicable provisions of the edition of the ASME and NFPA standards in effect when they were constructed and installed. Whenever existing installations are considered unsafe, extension repair due to accidental damage, major alteration due to accidental damage, or lack a qualified 24-hour attendant, flame safeguard and other pertinent controls and safety devices shall be brought up to the current code requirements.

(d) Each owner, user, or installer of boilers using flame safeguard equipment shall document the results of combustion safety testing. The frequency of testing shall be in accordance with the equipment manufacturer’s recommendations but shall be conducted at least upon the initial start-up and shutdown of the boiler. An inspection and maintenance schedule shall be established and performed to comply with the boiler and combustion system manufacturer’s recommendations. Documentation related to the combustion safety testing shall be kept on permanent file at the boiler location and shall be made available to the authorized inspector upon request. The use of re-built or remanufactured flame safeguard equipment shall not be allowed. Each boiler control

shall be listed as UL (underwriters laboratories), FM (factory mutual), or AGA (American gas association).

(e) Each boiler that operates continuously for more than 24 hours shall have a self-checking scanner that is compatible with the type of fuel being burned.

(f) All manually operated valves shall be of the T-handle or lever-handled type with the handle parallel to the gas flow only when in the open position and perpendicular to the gas flow only when in the closed position. The valve shall be accessible, and the handle position shall clearly indicate the "open" and "closed" positions. The handle shall be of adequate size to permit opening and closing the valve without the use of tools. All manually operated shutoff valves shall be maintained and exercised in accordance with the manufacturer's instructions to ensure the valve remains operable without the use of tools. The valve shall be located within 6 ft (2 m) of the boiler and must be readily accessible from the boiler room floor, not greater than 6 ft (2 m) from the boiler room floor or standing surface. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3,2006.)

49-50-20 New boilers, new boiler rooms, and boiler clearances. (a) Each owner, user, and installer of a new boiler shall be responsible for notifying the office of the Kansas State Fire Marshal within 72 hours of a boiler installation. Each new boiler shall be inspected at the time of installation by an inspector duly commissioned in accordance with K.S.A. 44-918 through K.S.A. 44-922, and amendments thereto.

(b) Each new boiler having an external width of over 36 inches shall have no fewer than 18 inches of clearance between the bottom of the boiler and the floor line, with access for inspection. When the width of the boiler is 36 inches or less, the distance between the bottom of the boiler and the floor line shall be not less than six inches. Each new boiler that is not enclosed in a separate building or separate room shall be isolated from the public and employees by a fire-rated wall as determined by occupancy in NFPA life safety code handbook, 2021 edition.

(c) Each new boiler room shall have one or more means of exit as determined by the Kansas State Fire Marshal or designee. Where more than one exit is provided, each shall be remotely located from the other. Each elevation of runway shall have at least two means of egress, each remotely located from the other.

(d) Each new boiler shall be located so that adequate space will be provided for the proper operation of the boiler and its appurtenances, for the inspection of all surfaces, tubes, water walls, economizers, piping, valves, and other equipment and for their necessary maintenance and repair. Specifications for all minimum clearances shall be provided by each boiler manufacturer and shall be listed in the manual provided to the installing contractor. In no case shall any clearance for access be less than those listed in section 1017 of the uniform mechanical code, 2021edition. The installation instruction manual shall remain available to the authorized inspector upon the inspector's request. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-50-21 Boilers and other appliances fired with LP gas. Boilers and other appliances fired with LP gas shall not be installed below grade, or in pits or other depressions where LP gas could accumulate. This prohibition shall apply unless the system meets the following conditions:

(a) It is equipped with an alarm system that sounds an alarm or with other approved alerting devices

(B) shuts down all of the equipment in the space; and

© is equipped with an approved exhaust system. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective April 28, 2000.)

49-50-22 Venting of atmospheric vents, gas vents, and bleed or relief lines.

(a) Each gas pressure regulator, pressure switch, safety shutoff valve, and any other gas control that has a threaded port shall be vented to the outdoors to a safe point of discharge or to the standing pilot if applicable. The material for each vent line shall be metallic, in accordance with the standards in NFPA 54, which is adopted in K.A.R. 49-50-2.

(b) The atmospheric vent lines shall not be connected to any common gas vent, to any threaded gas vent, or to any bleed or relief line on any double-block-and- bleed fuel train. Each boiler shall be vented separately. Use of vent limiters or restrictors are only allowed where venting outdoors is not possible.

(c) Each atmospheric vent line that has a threaded connection may be manifolded together in a common atmospheric vent line having a cross-sectional area that is not less than the area of the largest vent line plus 50% of the total areas of the additional vent lines.

(d) Each gas regulator and each pressure interlock switch, as well as any other fuel train component that requires atmospheric pressure to balance diaphragms or other similar devices, shall be provided with a pipe threaded connection for its vent line. The vent line shall be extended outdoors to a safe point of discharge at least 4 feet from sources of ignition, building openings, and not directly over any opening. A means shall be provided at the vent line's terminating point to prevent blockage of the line by foreign material, moisture, or insects.

(e) Each vent line and actuating line inside boiler casings shall be made of metallic material. (Authorized by and implementing K.S.A. 44-916; effective April 28,2000; amended Nov. 3, 2006.)

49-50-23 Certificate of inspection.

The current certificate of inspection for each stationary boiler shall be posted under a clear covering on the boiler room wall in a conspicuous location. The current certificate of inspection for each portable boiler shall be attached to the boiler. A utility power plant's certificate current certificate of inspection shall be posted under a clear covering in the control room of the utility power plant or another suitable location accessible to the inspector. (Authorized by K.S.A. 44- 916; implementing K.S.A. 44-924; effective Nov. 3, 2006.)

49-50-24 Installer qualifications.

Each person who installs, repairs, or tests boilers that have the capacity to generate 1,250,000 BTUH or more shall be authorized by the Kansas State Fire Marshal or designee before proceeding with the installation, repair, or testing of that type of boiler. If the Kansas State Fire Marshal or designee confirms that the person meets the applicable requirements in the standards and codes for the installation, repair, or testing, the State Fire Marshal or designee shall authorize the person to install, repair, or test that type of boiler. The person shall inform the Kansas State Fire Marshal before the boiler installation, repair, or testing begins and after it is completed. (Authorized by and implementing K.S.A. 44-916; effective Nov. 3, 2006.)

49-50-25 Electrical and electrical connection requirements.

All wiring for controls, heat generating apparatus, and other appurtenances necessary for the operation of a boiler shall be installed in accordance with the provisions of, ''National Electrical Code,'' which is adopted by reference. Any Boiler, hot water supply boilers, fire storage water heater, pool heaters, or any equipment that meet the provisions of this regulation that uses electrical power

for controls, heat generating apparatus and other appurtenances necessary for the operation of a boiler shall be connected to electrical power sources by permanent means using conductors sized according to the 'National Electrical Code,'' with a separate disconnecting means capable of being locked in the open position. Disconnecting means shall be installed at an accessible

location at or adjacent to the boiler so the boiler can be disconnected from all sources of potential energy. (Authorized by K.S.A. 44-916; implementing K.S.A. 44-924

Article 51. --HIGH PRESSURE BOILERS

49-51-1Age limit of existing boilers. (a) Any boiler of nonstandard construction installed before calendar year 1977 shall be removed from service at the age limit of 30 years except when both of these requirements are met:

(1) After a thorough internal and external inspection of such a nonstandard boiler and when required by the inspector, a hydrostatic pressure test of 1 1/2 times the allowable working pressure held for a period of at least 30-minutes shall be performed. If no distress or leakage develops, any boiler having other than a lap- riveted longitudinal joint may be continued in operation past the 30-year age limit at the working pressure determined by K.A.R. 49-51-3.

(2) The age limit of any nonstandard boiler having lap-riveted longitudinal joints and operating at a pressure in excess of 50 psig shall be 20 years. This type of boiler, when removed from an existing setting, shall not be reinstated for a pressure in excess of 15 psig. A reasonable time for replacement, not to exceed one year, may be granted by the Kansas State Fire Marshal or designee.

(b) The age limit of boilers of standard construction installed before the date this law became effective shall be dependent on the results of thorough internal and external inspection and, when required by the inspector, a hydrostatic pressure test not exceeding 1 1/2 times the allowable working pressure. If the boiler, under these test conditions, exhibits no distress or leakage, it may be continued in operation at the working pressure determined by K.A.R. 49-51-2.

(c) The shell or drum of a boiler in which a lap seam crack develops along a longitudinal lap-riveted joint shall be condemned. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-51-2 Maximum allowable working pressure for standard boilers and pressure vessels. The maximum allowable working pressure for standard boilers and pressure vessels shall be determined in accordance with the applicable provisions of the edition of the ASME code under which they were constructed and stamped. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-51-3 Maximum allowable working pressure for nonstandard boilers.

(a) The maximum allowable working pressure of a nonstandard boiler shall be determined by the application of the following formula:

TstE = maximum allowable working pressure psig RFS

where:

TS = ultimate tensile strength of shell plates, psig

T =minimum thickness of shell plate, in the weakest course, in inches E = efficiency of longitudinal joint: For tube ligaments, E shall be determined by the rules given in section I of the ASME code. For riveted construction, refer to the national board inspection code, 1998 Edition. For seamless construction, shall be considered to be 100 percent.

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

FS = factor of safety permitted.
Nonstandard boilers with welded seams shall not be operated at pressures exceeding 15 psig for steam or 30 psig for water.

(b) Tensile strength. When the tensile strength of steel or wrought iron shell plates is not known, it shall be deemed to be 55,000 psig for steel and 45,000 psig for wrought iron.

(c) Crushing strength of mild steel. The resistance to crushing of mild steel shall be deemed to be 95,000 psig.

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

PSIG

Iron rivets in single shear 38,000

Iron rivets in double shear 76,000

Steel rivets in single shear 44,000

Steel rivets in double shear 88,000

When the diameter of the rivet holes in the longitudinal joints of a boiler is not known, the diameter and cross-sectional area of rivets, after driving, may be selected from the following table, or as ascertained by cutting out one rivet in the body of the joint:

Table sizes of rivets based on plate thickness, thickness of
plate-inch 1/4 9/32 5/16 11/32 3/8 13/32
diameter of rivet after driving-inch 11/16 11/16 3/4 3/4 13/16 13/16 thickness of
plate-inch 7/16 15/32 1/2 9/16 5/8
diameter of rivet after driving inch 15/16 15/16 15/16 11/16 11/16 11/16

(Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-51-3a. Safety factors for boilers and pressure vessels.

The department’s inspector shall decrease the working pressure if the condition and safety of the boiler or pressure vessel warrant it. The following safety factors shall represent the minimum values to be used:

(a) The lowest safety factor permissible on existing boilers and pressure vessels and newly installed boilers shall be 4.0.

(B)The safety factor shall be eight for horizontal-return tubular boilers that have continuous longitudinal lap seams that are more than 12 feet in length. If this type of boiler is removed from its existing setting, it shall not be reinstalled in a manner that allows the boiler to operate at pressures in excess of 15 psig.

© The lowest permissible safety factor for new pressure vessels shall be no less than 3.5.

(D) If an existing boiler or pressure vessel is constructed to operate with a higher safety factor than a safety factor required by this regulation, the higher safety factor shall not be lowered for any reason. (Authorized by and implementing
K.S.A. 44-916; effective April 28, 2000; amended Nov. 3, 2006.)

49-51-4. Cast iron headers and mud drums. The maximum allowable working pressure on a water tube boiler with tubes which are secured to cast iron or malleable iron headers, or which have cast iron mud drums shall not exceed 160 psig. (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987.)

49-51-5. Pressure on cast iron boilers. The maximum allowable working pressure for any cast iron boiler, except hot water boilers, shall be 15 psig. (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987.)

49-51-6. Safety valves. Weighted-lever safety valves or safety valves that have either a seat or a disk that is made of cast iron shall not be used. The owner, user, or installer of the boiler shall replace any valve of this type of construction, when found, with a direct, spring-loaded, pop-type valve that conforms to the applicable standards of the following:

(1) ASME code, section I, rules for construction of power boilers, which is adopted in K.A.R. 49-45-1.

(2) ASME code, section IV, rules for construction of heating boilers, which is adopted in K.A.R. 49-45-5; and

(3) ASME code, section VIII, rules for construction of pressure vessels, division 1, which is adopted in K.A.R. 49-45-29.

(b) Each high-pressure boiler shall have at least one safety valve that is approved and certified by the ASME and the national board. If the boiler has more than 500 square feet of water-heating surface or an electric power input of more than 500 kw, the boiler shall have two or more safety valves of the same type.

(c) Each safety valve required in subsection (b) shall be connected to the boiler in a vertical position, shall be independent of any other steam connection, and shall be attached as close as possible to the boiler without unnecessary intervening pipe or fittings. If an alteration is required to conform to this requirement, the owner, user, or installer of the boiler shall be allowed a reasonable period of time in which to complete the work as permitted by the Kansas State Fire Marshal or designee.

(d) No valves of any type shall be placed between the safety valve and the boiler or on any escape pipe. If an escape pipe is used, its size shall be at least the same size of the safety valve discharge, and the pipe shall be fitted with an open drain to prevent water from lodging in the upper part of the safety valve or in the escape pipe. Horizontal escape piping that provides adequate gravity drainage shall not normally require the fitting of an open drain. If an elbow is placed on a safety valve escape pipe, the elbow shall be located close to the safety outlet, or the escape pipe shall be anchored and supported securely. All safety discharges shall be so located or piped to be carried clear of walkways or platforms. If discharge piping is directed downward, the pipe shall terminate no more than six inches above floor level. Plastic discharge piping shall not be used on any safety valve discharge line.

(e) The safety valve capacity of each boiler shall be sufficient to discharge all of the steam that can be generated by the boiler without allowing the pressure of the boiler to rise more than six percent above the boiler's highest pressure to which any valve is set. The pressure of the boiler shall not be allowed to rise more than six percent above the boiler's maximum allowable

working pressure.

(f) Each boiler shall have one or more safety valves that are set at or below the maximum allowable working pressure of the boiler. The remaining valves may be set within a range of three percent above the maximum allowable working pressure of the boiler. The range of the settings for all of the safety valves on a boiler shall not exceed 10% of the highest pressure to which any valve is set.

(g) When two or more interconnected boilers are operating at different pressures and with different safety valve settings, the lower-pressure boilers or the interconnected piping shall be equipped with safety valves that have a sufficient capacity to prevent overpressure, considering the maximum generating capacity of all of the boilers.

(h) If a boiler is supplied with feed water directly from water mains without the use of a feeding apparatus, excluding return traps, a safety valve shall not be set at a pressure greater than 94% of the lowest pressure obtained in the water supply main feeding the boiler. The relieving capacity of all of the safety valves on that boiler shall be checked by one of the three following methods, and, if their relieving capacity is found to be insufficient, additional valves shall be provided:

(1) By making an accumulation test. An accumulation test shall consist of shutting off all other steam discharge outlets from the boiler and forcing the fires to the maximum. The safety valve's relieving capacity shall be sufficient to prevent a rise of pressure in excess of six percent of the boiler's maximum allowable working pressure. This method shall not be used on a boiler with a super heater or re- heater;

(2) by measuring the maximum amount of fuel that can be burned and by computing the corresponding steam-generating capacity upon the basis of the heating value of this fuel. These computations shall be made as outlined in the appendix of the ASME Code, Section I, which is adopted in K.A.R. 49-45-1; or

(3) by measuring the maximum amount of feed water that can be evaporated. If either of the methods outlined in paragraphs (h)(1) and (h)(2) is employed, the sum of the safety valve capacities shall be equal to or greater than the maximum evaporative capacity, which is the maximum steam-generating capacity of the boiler.

(i) Top-discharge safety valves shall not be used on any steam boiler. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-51-7 Boiler feeding. (a) Each boiler shall have a feed supply that will permit it to be fed at any time while under pressure.

(b) Each boiler having more than 500 square feet of water heating surface shall have at least two suitable means of feeding, at least one of which shall be a feed pump. A source of feed at a pressure three percent greater than the set pressure of the safety valve with the highest setting may be considered one of the means. Boilers fired by gaseous, liquid, or solid fuel in suspension may be equipped with a single means of feeding water, if means are furnished for the shutoff of heat input before the water level reaches the lowest safe level.

(c) The feed water shall be introduced into the boiler in a manner preventing it from being discharged close to riveted joints of shell or furnace sheets, directly against surfaces exposed to products of combustion, or to direct radiation from the fire.

(d) The feed piping to the boiler shall be provided with a check valve near the boiler and a valve or cock between the check valve and the boiler. When two or more boilers are fed from a common source, there shall also be a valve on the branch to each boiler between the check valve and the source of supply. Whenever a globe valve is used on feed piping, the inlet shall be under the disk of the valve.

(e) In all cases in which returns are fed back to the boiler by gravity, there shall be a check valve and stop valve in each return line. The stop valve shall be placed between the boiler and the check valve. Both shall be located as close to the boiler as is practicable.

(f) If de-aerating heaters are not employed, the temperature of the feed water shall not be less than 120°F. to avoid the possibility of setting up localized stress. If de-aerating heaters are employed, the minimum feed water temperature shall not be less than 215°F. so that dissolved gases may be thoroughly released.
(Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-58-8 Water level indicators. (a) No outlet connections, except for any damper regulator, feed water regulator, low water fuel cutout, drain, gauge, or other apparatus that does not permit the escape of an appreciable amount of steam or water from it, shall be placed on the piping that connects the water column to the boiler. The water column shall be provided with a valved drain of at least 3/4-inch pipe size. The discharge shall be piped to a safe location.

(B) For all installations in which the water gauge glass or glasses are more than 30 feet above the boiler operating floor, remote water level indicating or recording gauges shall be installed at eye height above the operating floor. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-51-9 Steam gauges. (a) Each steam boiler shall have a steam gauge with dial range not less than 11/2 or more than 31/2 times the maximum allowable working pressure connected to the steam space or to the steam connection to the water column. The steam gauge shall be connected to a siphon or equivalent device of sufficient capacity to keep the gauge tube filled with water. The steam gauge shall be arranged so that the gauge cannot be shut off from the boiler except by a cock placed near the gauge. The cock shall be provided with a tee or lever handle arranged to be parallel to the pipe in which it is located when the cock is open.

(b) When a steam gauge connection longer than eight feet becomes necessary, a shut-off valve may be used near the boiler if the valve is the outside-screw-and- yoke type and is locked open. The line shall be of ample size with provision for free blowing.
(c) Each boiler shall be provided with a 1/2 -inch nipple and globe valve connected to the steam space for the exclusive purpose of attaching a test gauge when the boiler is in service so that the accuracy of the boiler steam gauge may be ascertained. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-51-10 Stop valves.
(a) Each steam outlet from a boiler, except safety valve and water column connections, shall be fitted with a stop valve located as close as practicable to the boiler.
(B) When a stop valve is so located that water can accumulate, ample drains shall be provided. The drainage shall be piped to a safe location and shall not be discharged on the top of the boiler or its setting.
©When boilers provided with manholes are connected to a common steam main, the steam connection from each boiler shall be fitted with two stop valves that have an ample free blow drain between them. The discharge of the drain shall be visible to the operator while manipulating the valves and shall be piped clear of the boiler setting. One of the stop valves shall be an automatic non-return valve that is set next to the boiler, and the second valve shall be the outside- screw-and-yoke type and shall meet the requirements of sections I, IV, and VIII of the ASME code. All piping, fittings, and valves shall meet the requirements of the current code

of construction. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-51-11 Blow-off connection.

(a) The construction of the setting around each blow-off pipe shall permit free expansion and contraction. These setting openings shall be sealed without restricting the movement of the blow-off piping.

(b) All blow-off piping exposed to furnace heat shall be protected by fire brick or other heat-resistant material constructed to provide access to the piping for inspection.

(c) Each boiler shall have a blow-off pipe that is fitted with a valve or cock that is directly connected to the lowest water space. Each cock shall be a gland or guard cock and shall be suitable for the pressure allowed. Globe valves shall not be used. If the maximum allowable working pressure of the boiler exceeds 100 psig, each blow-off pipe shall be provided with either two valves or a valve and a cock.

(d) If the maximum allowable working pressure of the boiler exceeds 100 psig, the portion of the boiler's blow-off piping from the boiler to the valve or valves shall consist of extra heavy steel. The blow-off piping shall be full size, and reducers or bushings shall not be used in the piping. The piping shall not be galvanized.

(e) All fittings between the boiler and blow-off valve shall consist of steel. If blow- off pipes or fittings are renewed, they shall be installed in accordance with the regulations for new installations contained within these regulations.

(f) Each blow-down from a boiler or boilers that enters a sanitary sewer system and any blow-down that is determined by the chief boiler inspector to be a hazard to life or property shall pass through some form of blow-off equipment that will reduce pressure and temperature as required in this subsection.

(1) The temperature of the water leaving the blow-off equipment shall not exceed 140°F.

(2) The pressure of the blow-down leaving any type of blow-off equipment shall not exceed 5 psig.

(3) The blow-off piping and fittings between the boiler and the blow-off tank shall meet the requirements of paragraphs PG-58 and PG-59 of the ASME boiler and pressure vessel code, section I, as adopted in K.A.R. 49-45-1.

(4) All materials used in the fabrication of boiler blow-off equipment shall meet the requirements of the material specifications in section II of the ASME boiler and pressure vessel code, as adopted in K.A.R. 49-45-2, K.A.R. 49-45-3, K.A.R. 49- 45-4, and K.A.R. 49-45-4a.

(5) Blow-down tanks shall be constructed to meet the requirements of section VIII of the ASME code, rules for the construction of pressure vessels, division I, as adopted in K.A.R. 49-45-29, K.A.R. 49-45-30, and K.A.R. 49-45-31.

(6) All blow-off equipment shall be fitted with openings to facilitate cleaning and inspection.

(7) All blow-off equipment shall be installed in accordance with "a guide for blow- off vessels,'' 2004 edition, NB-27, rev. 2, which is hereby adopted by reference. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-51-12 Repairs and renewals of boiler and pressure vessel fittings and appliances.

If repairs are made to any fittings or appliances of a boiler or pressure vessel or if it becomes necessary to replace them, the repairs or replacements shall meet the provisions of the following standards:

(a) ASME code sections I and VIII, as adopted in K.A.R. 49-45-1, K.A.R. 49-45-29, K.A.R.

49-45-30, and K.A.R. 49-45-31.
(B)ASME B 31.1, as adopted in K.A.R. 49-45-28.
(c) ASME CSD-1, as adopted in K.A.R. 49-45-27.

(D)NFPA sections 85, 85A, 85F, and 86, as adopted in K.A.R. 49-45-37, K.A.R. 49- 45-38, K.A.R. 49-45-39, K.A.R. 49-45-40; and
€The national board inspection code, as adopted in K.A.R. 49-45-20. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-51-13. Conditions not covered by these requirements. All cases not specifically covered by these requirements shall be treated as new installations or may be referred to the chief inspector for instructions concerning the requirements. (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987.)

49-51-14 (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987; revoked April 28, 2000.

Article 52. --LOW PRESSURE HEATING BOILERS

49-52-1. Standard boilers. The maximum allowable working pressure of standard boilers shall in no case exceed the pressure indicated by the manufacturer's identification stamped or cast on the boiler or on a plate secured to it. (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987

49-52-2. Nonstandard riveted boilers. The maximum allowable working pressure on the shell of a nonstandard riveted heating boiler shall be determined in accordance with K.A.R. 49-51-3. The maximum working pressure of a steam heating boiler shall be 15 psig and the maximum working pressure or temperature of a hot water boiler shall be 160 psig or 250° F temperature. (Authorized by and implementing K.S.A. 1985 Supp. 44-916 and K.S.A. 44-914; effective May 1, 1987.)

49-52-3. Nonstandard welded boilers. The maximum allowable working pressure of a nonstandard steel or wrought iron heating boiler of welded construction shall not exceed 15 psig for steam. For other than steam service, the maximum allowable working pressure shall be calculated in accordance with section IV of the ASME code (in effect on January 1, 1987), but in no case shall it exceed 30 psig. (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987.)

49-52-4. Nonstandard cast iron boilers. (a) The maximum allowable working pressure of a nonstandard boiler composed principally of cast iron shall not exceed 15 psig for steam service or 30 psig for hot water service.
(b) The maximum allowable working pressure of a nonstandard boiler having cast iron shell or heads and steel or wrought iron tubes shall not exceed 15 psig for steam service or 30 psig for hot water service. (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987.)

49-52-5 Safety valves. (a) Each steam boiler shall have one or more ASME or national board-approved and certified safety valves of the spring pop-type adjusted and sealed to discharge at a pressure not to exceed 15 psig. Seals shall be attached in a manner that prevents the valve from being taken apart without breaking the seal. The safety valves shall be arranged so that they cannot be reset to relieve at a higher pressure than the maximum allowable working pressure of

the boiler. A body drain connection below sea level shall be provided by the manufacturer, and this drain shall not be plugged during or after field installation. For valves exceeding two inches of pipe size, the drain hole or holes shall be tapped not less than 3/8-inch pipe size. For valves less than two inches, the drain hole shall not be less than 1/4 inch in diameter.

(b) A safety valve for a steam boiler shall not be smaller than 1/2 inch unless the boiler and radiating surfaces consist of a self-contained unit. A safety valve shall not be larger than 4 1/2 inches. The inlet opening shall have an inside diameter equal to or greater than the seat diameter.

(c) The minimum relieving capacity of the valve or valves shall be governed by the capacity marking on the boiler.

(d)(1) The minimum valve capacity in pounds per hour shall be the greater of the valves determined by either of the following:

(A) Dividing the maximum BTUH output at the boiler nozzle obtained by the firing of any fuel for which the unit is installed by 1,000; or

(B) Using the pounds of steam generated per hour per square foot of boiler heating surface as given in the following table:

	Minimum pounds of steam per hour per square foot of heating surface.	
	Firetube	Watertube
Boiler heating surface:	boilers	boilers
Hand-fired	5	6
Stoker-fired	7	6
Oil, gas, or pulverized fuel-fired	8	10
Waterwall heating surface:		
Hand-fired	8	8
Stoker-fired	10	12
Oil, gas, or pulverized		

fuel-fired	14	16

(2) When a boiler is fired only by gas with a heat value not in excess of 200 BTUH per cubic feet, the minimum safety valve or safety relief valve relieving capacity shall be based on the value given for hand-fired boilers above.

(3) The minimum safety valve or safety relief valve relieving capacity for electric boilers shall be 3 1/2 pounds per hour per kilowatt input.

(4) The amount of heating surface in a boiler shall be determined according to the provisions of ASME code section IV, paragraph HG-403.

(e) The safety valve capacity for each steam boiler shall be such that, with the fuel burning equipment installed and operating at maximum capacity, the pressure cannot rise more than 5 psig above the maximum allowable working pressure.

(f) When operating conditions are changed or additional boiler heating surface is installed, the valve capacity shall be increased, if necessary, to meet the new conditions in accordance with subsection (e). When additional valves are required, they may be installed on the outlet piping if there is no intervening valve.

(g) If there is any doubt as to the capacity of the safety valve, an accumulation test shall be run in accordance with the ASME code, section VI.

(h) No valve of any description shall be placed between the safety valve and the boiler nor on the discharge pipe between the safety valve and the atmosphere. The safety valve shall be installed in a vertical position.

(i) The discharge pipe shall be at least full size and shall be fitted with an open drain to prevent water lodging in the upper part of the safety valve or in the discharge pipe. When an elbow is placed on the safety valve discharge pipe, the elbow shall be located close to the safety valve outlet, or the discharge pipe shall be securely anchored and supported. All safety valve discharges shall be located or piped in a manner that will not endanger persons working in the area. When discharge piping is directed downward, the pipe shall terminate six inches above floor level. Plastic discharge piping shall not be used.

(j) When two or more safety valve discharge lines are connected together, the cross-sectional area of the common discharge line shall equal or exceed the cross-sectional area of the combined safety valve discharge outlets. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-52-6 Safety relief valve requirements for hot water boilers and hot water supply boilers. (a)(1) Each hot water heating boiler, hot water supply boiler and pool heater shall have at least one ASME-certified or national board-certified safety relief valve set to relieve at or below the maximum allowable working pressure (MAWP) of the boiler not to exceed the MAWP of the lowest rated component in the system. Each hot water supply boiler of the water tube or coil type shall have at least one safety relief valve that is approved and certified by ASME or the national board. The safety relief valve shall be of the automatic reseating type and shall be set to relieve at or below the maximum allowable working pressure of the boiler. If the capacity of the safety relief valve is certified by the ASME or the national board, the safety relief valve shall have pop action when tested by steam.

(2) If more than one safety relief valve is used on either a hot water heating boiler or a hot water supply boiler, the additional valve or valves shall be ASME-rated. The additional valves shall be set to relieve at or below the maximum allowable working pressure of the vessel or any component in the system.

(3) Each safety relief valve shall be spring-loaded. A safety relief valve shall not be capable of being reset at a higher pressure than the maximum allowable working pressure of the boiler or pressure vessel.

(b) Materials that can fail due to deterioration or vulcanization when subjected to saturated steam temperatures corresponding to the maximum capacity test pressure shall not be used for safety relief valves.

(c) A safety relief valve shall not be smaller than 3⁄4 inch or larger than 41⁄2 inches standard pipe size, except that boilers having a heat input not greater than 15,000 BTUH may be equipped with a safety relief valve of 1⁄2-inch standard pipe size. The inlet opening shall have an inside diameter that is approximately equal to or greater than the seat diameter. The minimum opening through any part of the valve shall not be less than 1⁄2 inch in diameter or its equivalent area.

(D)The steam-relieving capacity, in pounds per hour, of each pressure-relieving device on a boiler shall be the greater of the steam-relieving capacity determined by either of the following methods:

(1) Dividing the maximum output in BTUH by 1,000, where the maximum output is the output obtained at the boiler nozzle by the firing of any fuel the unit is capable of using; or (2) using the number of pounds of steam generated per hour per square foot of boiler heating surface as specified in the table in K.A.R. 49-52-5 (d)(1).

€If operating conditions are changed or additional boiler heating surface is installed, the valve capacity shall be increased, if necessary, to meet the new conditions in accordance with subsection (f). The additional valves required because of the changed conditions or additional heating surfaces may be installed on the outlet piping if there is no intervening valve.

(F)The safety relief valve capacity for each boiler shall be sufficient to prevent the pressure from rising more than 5 psig above the boiler's maximum allowable working pressure with the fuel-burning equipment installed. Each storage water heater and each hot water supply boiler shall have T & P relief valves with a CSA relieving capacity and an American Gas Association rating that is equal to or exceeds the burner BTUH input or the electrical power kilowatt input. Each hot water supply boiler that is of the coil or water tube type shall be equipped with a safety relief valve. The connecting hot water storage tank shall have a pressure and temperature safety relief valve with a temperature-relieving capacity equivalent to the total burner BTUH input.

(G)(1) Each safety relief valve shall be installed in a vertical position, except for T & P relief valves that are installed on storage water heaters equipped with side tapping to accommodate the insertion of the T & P valve thermostat. The T & P valve thermostat shall be immersed in the water and located in the top six inches of the vessel. No valve of any type shall be placed between the safety relief valve and the boiler or on the discharge pipe between the safety relief valve and the atmosphere.

(2) The diameter of the discharge pipe shall not be less than the diameter of the safety discharge opening and shall be fitted with an open drain to prevent water from lodging in the upper part of the safety relief valve or in the discharge pipe. Horizontal discharge piping that provides adequate gravity drainage shall not require the fitting of an open drain, except as specified in this paragraph. If an elbow is placed on the safety relief valve discharge pipe, the elbow shall be located close to the safety relief valve outlet, or the discharge pipe shall be securely anchored and supported.

(3) All safety relief valve discharges shall be located or piped in a manner that does not endanger persons working in the area. If discharge piping is directed downward, the pipe shall terminate no more than six inches above floor level. Plastic discharge piping shall not be used on any safety relief valve discharge line, including discharge lines for domestic hot water heaters of any size.

(3) If two or more safety relief valve discharge lines are connected together, the cross-sectional area of the common discharge line shall equal or exceed the combined cross-sectional areas of all of the connected safety relief valve outlets. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-52-7 Steam gauges. (a) Each steam boiler shall have a steam gauge connected to its water column or a steam connection by means of a siphon or equivalent device exterior to the boiler. The siphon shall be of sufficient capacity to keep the gauge tube filled with water and shall be arranged so that the gauge cannot be shut off from the boiler except by a cock with tee or lever handle placed in the pipe near the gauge. The handle of the cock shall be parallel to the pipe in which it is located when the cock is open.

(b) The scale on the dial of a steam gauge shall be graduated to not less than 30 psig or more than 3 1/2 times the maximum allowable working pressure. The gauge shall be provided with effective stops for the indicating pointer at the zero point and at the maximum pressure point. The pointer shall travel at least three inches from the zero to 30 psig pressure mark. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-52-8 Pressure or altitude gauge and thermometers. (a) Each hot water boiler shall have a pressure or altitude gauge connected to it or to its flow connection in such a manner that it cannot be shut off from the boiler except by a cock with tee or lever handle placed on the pipe near the gauge. The handle of the cock shall be parallel to the pipe in which it is located when the cock is open.

(b) The scale on the dial of the pressure or altitude gauge shall display approximate graduation to not less than 1 1/2 or more than three times the maximum allowable working pressure.

(c) Piping or tubing for pressure altitude gauge connections shall be of nonferrous metal when smaller than one inch of pipe size

(d) Each hot water boiler shall have a thermometer that is located and connected in such a manner that both of the following conditions are met:

(1) The thermometer is easily readable during observation of the water pressure or altitude gauge,

(2) The thermometer will at all times indicate the temperature, in degrees Fahrenheit, of the water in the boiler at or near the outlet.

(e) Each hot water supply boiler shall have a thermometer installed in the hot water supply line. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-52-9 Water gauge glasses. (a) Each steam boiler shall have one or more water gauge glasses attached to the water column or boiler by means of valved fittings. The lower fitting shall be provided with a drain valve of the straightway type with an opening not less than 1/4 inch in diameter to facilitate cleaning. Gauge glass replacement shall be possible while the boiler is under pressure.

(b) Transparent material, other than glass, may be used for the water gauge if the material has proven suitable for the pressure, temperature, and corrosive conditions encountered in service.

(c) Gauge glasses shall be installed to show a water level in the boiler at or above the lowest permissible level as defined by the manufacturer of the boiler, and the low water cutoffs shall be

installed accordingly. (Authorized by and implementing
K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000.)

49-52-10. Stop valves and check valves.

(a) If a boiler can be closed off from the heating system by closing a steam stop valve, there shall be a check valve in the condensate return line between the boiler and the system.

(b) If any part of a heating system can be closed off from the remainder of the system by closing a steam stop valve, there shall be a check valve in the condensate return pipe from that part of the system.

(c) If multiple steam boilers with manholes are functionally connected to each other through a manifold, each boiler shall have two stop valves with a free blow drain between the two valves. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended Nov. 3, 2006.)

49-52-11 Feed water connections, automatic low water fuel cutoff, and water feeding devices. (a) Feed water, makeup water, or water treatment materials shall be introduced into a boiler through the return piping system or through an independent feed water connection that does not discharge against parts of the boiler exposed to direct radiant heat from the fire. Feed water, makeup water, or water treatment materials shall not be introduced through openings or connections provided for any of the following:

(1) Inspection or cleaning

(2) safety valves or safety relief valves; or

(3) surface blow-off, or the water column, water gauge glass, pressure gauge, or temperature gauge.

(b) The feed-water pipe shall be provided with a check valve near the boiler and a stop valve or cock between the check valve and the boiler or return pipe system.

(c) Each automatically fired steam or vapor system boiler shall be equipped with an automatic low water fuel cutoff located in a manner that will automatically cut off the fuel supply when the surface of the water falls to the lowest safe water line. The boiler shall also have a secondary low water cutoff that will cut off the fuel supply and lock out the burner and shall be equipped with a manual reset. If a water feeding device is installed, it shall be constructed so that the water inlet valve cannot feed water into the boiler through the float chamber. The inter- feeding device shall be located to supply requisite feedwater. The lowest safe water line shall not be lower than the lowest visible part of the water glass.

(d) A fuel or feed-water control device may be attached directly to a low-pressure boiler on the tapped openings in low pressure boilers that are provided for attaching a water glass directly to the boiler. The connections between the boiler and the water glass shall be nonferrous tees or Y's of not less than 1/2-inch pipe size. The water glass shall be attached directly, and as closely as possible, to the boiler. The water glass fittings shall be attached to the straightway topping of the Y or T. The fuel cutoff or water feeding device shall be attached to the side outlet of the Y or T. The ends of all nipples shall be reamed to full size diameter.

(e) Designs using a float and float bowl shall have a vertical, straight-away valve drainpipe at the lowest point in the water equalizing pipe. The connections in this installation shall permit the bowl and the equalizing pipe to be flushed and the device tested. A low water fuel cutoff control device shall be installed in all hot water heating systems with inputs exceeding 400,000 BTUH. Blow-down valves and pipe attachments shall be a minimum of 3/4 inches.

(f) A low water fuel cutoff shall be installed on all hot water heating systems, including systems under 400,000 BTUH that are not exempted. The low water cutoff shall be a float

type, flow switch, or probe type installed in the boiler or piping above the boiler.

(g) Low water cutoffs installed on all hot water heating boilers shall be installed above the boiler and shall be equipped with a manual rest, with no intervening valves between the boiler and the low water cutoff. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective May 1, 1987; amended April 28, 2000)

49-52-12. Return pump. Each boiler equipped with a condensate return pump shall be provided with a water level control arranged to automatically maintain the water level in the boiler within the range of the gauge glass. (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987.)

49-52-13 Provisions for thermal expansion in hot water systems. (a) All hot water heating systems incorporating hot water tanks or fluid relief columns shall be installed in a manner that will prevent freezing under normal operating conditions.

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

(c) Closed systems. If the system is closed, an airtight tank or other suitable air cushion shall be installed that will be consistent with the volume and capacity of the system, and it shall be suitably designed for a hydrostatic test pressure of 2 1/2 times the allowable working pressure of the system. Expansion tanks for systems designed to operate above 30 psig shall be constructed in accordance with section VIII, division 1, as required by section IV of the ASME code. Provisions shall be made to drain the tank without emptying the system, except for pre-pressurized tanks.

(d) Non code expansion tanks installed on hot water heating systems shall be restricted to no more than 30 psi working pressure. (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987; amended April 28, 2000)

49-52-14 Repair and replacement of fittings and appliances.

(a) If repairs are made to fittings or appliances or if it becomes necessary to replace them, the repairs shall meet the following standards:

(1) Sections I, IV, and VIII of the ASME code for new construction, as adopted in K.A.R. 49-45-1, K.A.R. 49-45-5, K.A.R. 49-45-29, K.A.R. 49-45-30, and K.A.R. 49-45- 31.

(2) ASME CSD-1, as adopted in K.A.R. 49-45-27;

(3) NFPA 85, 85A, 85F, and 86, as adopted in K.A.R. 49-45-37 through K.A.R. 49- 45-40; and

(4) The national board inspection code, as adopted in K.A.R. 49-45-20.

(b) Each electrical control and each safety device shall bear a label and shall be listed by a nationally recognized agency, including UL (underwriters laboratories), *but not limited to,* FM (factory mutual), or AGA (American gas association), and shall bear an identification label from one of these agencies. (Authorized by and implementing K.S.A. 44-916; effective May 1, 1987; amended April 28, 2000; amended Nov. 3, 2006.)

49-52-15 (Authorized by and implementing K.S.A. 1985 Supp. 44-916; effective May 1, 1987; revoked April 28, 2000)

49-52-16 Provisions for thermal expansion in hot water supply systems. If the system is equipped with a check valve or pressure-reducing valve in the cold-water inlet line, an **a**irtight expansion tank or other suitable air cushion shall be used. If provided, the tank shall be constructed according to the requirements of section VIII, division 1 of the ASME code, with a maximum allowable working pressure to equal or exceed the working pressure of the hot water supply boiler. (Authorized by and implementing K.S.A. 1998 Supp. 44-916; effective April 28, 2000.)

49-52-17 Emergency shutoff switches. An emergency shutdown or shut off switch shall be installed at each exit for any boiler, high or low pressure, steam or hot water heating boiler, hot water supply boiler, fire storage water heater, or pool heater of any size equipped with a power burner regardless of burner capacity. Each emergency shutdown or shut off switch shall be marked for easy identification. Each emergency shutdown or shut off switch must be installed at each exit for all boilers, high or low pressure, steam or hot water heating boilers, hot water supply boilers, fire storage water heaters, or pool heaters with a BTUH input of 400,000 or more regardless of burner type. Each emergency shut down or shut off switch installed by each exit shall meet the requirements of NFPA 70, "national electrical code," which is adopted by reference, and ASME CSD-1, as adopted in K.A.R. 49-45-27. Each boiler with an input of 12,500,000 BTUH or more shall meet the requirements of NFPA 70 and NFPA 85, 85A, 85F and 86, as adopted in K.A.R. 49-45-37 through K.A.R. 49-45-40. (Authorized by and implementing K.S.A. 44-916; effective April 28, 2000; amended Nov. 3, 2006.)

49-52-18 Hot water supply boilers. (a) No hot water supply boiler or commercial or domestic type of water heater of any size shall be used for any type of comfort heat. This prohibition shall include floor heat and closed-loop hot water heating systems of any kind. Each boiler that is used for heating purposes and is not made of cast iron shall be code-stamped and registered with the national board of boiler and pressure vessel inspectors.

(b) No hot water heating system shall be connected with any domestic hot water system or be used in combination as a building heating system and domestic hot water system.

(c) No hot water supply boiler code-stamped "HLW" shall be used for any kind of comfort heat.

(d) For the purposes of each boiler certification inspection, when a hot water supply boiler is connected to a hot water supply tank with no intervening shut off valves, this combination shall be considered one unit.

(e) Each hot water supply boiler that requires electricity to power burners, to stack dampers, or to start an electronic ignition shall be hardwired into the facility's electrical system. (Authorized by and implementing K.S.A. 44-916; effective Nov. 3, 2006)

49-52-19 Pool heaters. (a) Each pool heater shall have the following controls and safety devices that meet the following requirements:

(1) A safety relief valve, with a set pressure not to exceed the maximum allowable working pressure of the lowest rated component in the system; and

(2) a pressure switch or a flow switch that prevents the burner from operating if the circulating pump is not in operation and that maintains adequate temperature controls conforming to the generally acceptable standards for pool heaters.

(B)Each pool heater that can generate at least 400,000 BTUH shall be constructed to meet the requirements of ASME section IV, as adopted by reference in K.A.R. 49-45-5, and shall be registered with the national board. Each pool heater shall be equipped with the controls and safety devices required for heating boilers. (Authorized by and implementing K.S.A. 44-916; effective Nov. 3, 2006.)

Article 54. – HEARINGS

49-54-1 to 49-54-3 (Revoked April 28, 2000)