AN ACT

TO REGULATE BOILER SAFETY IN SOUTH CAROLINA

Chapter 14

S. C. DEPARTMENT OF LABOR, LICENSING AND REGULATION
BOILER SECTION

COLUMBIA, S.C.

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CHAPTER 14

TITLE 41

SOUTH CAROLINA BOILER SAFETY ACT

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Section 41-14-10. This chapter may be cited as the 'Boiler Safety Act' and, except as otherwise provided in this chapter, applies to all boilers.

Section 41-14-20. For the purposes of this chapter:

(1) 'API-ASME' means the American Petroleum Institute-American Society of Mechanical Engineers.

(2) 'ASME' means the American Society of Mechanical Engineers.

(3) 'Board' means the Contractors' Licensing Board.

(4) 'Boiler' means a closed vessel in which water or other liquid is heated, steam or vapor is generated, or steam is superheated, or in which any combination of these functions is accomplished, under pressure or vacuum, for use externally to itself, by the direct application of energy from the combustion of fuels or from electrical, solar, or nuclear energy. The term 'boiler' includes fired units for heating or vaporizing liquids other than water where these units are separate from processing systems and are complete within themselves. The term 'boiler' is further defined to include any of the following terms:

(a) 'heating boiler' means a steam or vapor boiler operating at pressures not exceeding 15 psig or a hot water boiler operating at pressures not exceeding 160 psig or temperatures exceeding 250 degrees Fahrenheit; or

(b) 'high pressure, high temperature water boiler' means a water boiler operating at pressures exceeding 160 psig or temperatures exceeding 250 degrees Fahrenheit; or

(c) 'power boiler' means a boiler in which steam or other vapor is generated at a pressure of more than 15 psig.

(5) 'Department' means the Department of Labor, Licensing and Regulation.

(6) 'Director' means the Director of the Department of Labor, Licensing and Regulation.

(7) 'Owner' means the person or persons who own or operate any business operating a boiler required to be registered under this chapter.

Section 41-14-30. (A)(1) The department shall promulgate regulations for the safe installation and inspection of boilers in this State.

(2) All new installations shall conform to generally accepted nationwide engineering standards. Conformity with the most recent edition of the Boiler and Pressure Vessel Code or the ASME Code shall be accepted as conformity with generally accepted nationwide engineering standards.

(3) The department shall promulgate regulations for installation and inspection of boilers which were in use in this State prior to the implementation of the statewide building code. The regulations must be based upon, and at all times follow, generally accepted nationwide engineering standards and practices and may adopt applicable sections of the Inspection Code of the National Board of Boiler and Pressure Vessel Inspectors.

(B) The regulations and any subsequent regulations promulgated by the department must be adopted pursuant to the Administrative Procedures Act.

Section 41-14-40. (A) Any new boiler installed and operated in this State, unless otherwise exempted, must be designed and constructed in accordance with the ASME Code or a nationally recognized code of construction. Any new boiler installed in this State must be marked in accordance with the code of construction and must be registered with the National Board of Boiler and Pressure Vessel Inspectors. Copies of registration documents must be provided to the jurisdiction when requested.

(B) Only a boiler that conforms to the regulations of the department governing installation must be installed and operated in this State after twelve months from the date upon which the first regulations under this chapter pertaining to installation have become effective; however, the department may issue a special installation and operating permit for a boiler that is of special design or construction and that is not inconsistent with the spirit and safety objectives of the regulations. The department shall issue a special installation and operating permit after determining on the record and after an opportunity for inspection of the boiler or the plans for the boiler that the proponent of the special permit has demonstrated by a preponderance of the evidence that the special design or construction will provide an equivalent degree of safety to that of conformance with the regulations. The department shall accept comments from any interested party concerning the application for a special installation and operating permit. The permit so issued shall prescribe the conditions the owner or operator must maintain.

Section 41-14-50. (A) The maximum allowable working pressure of a boiler carrying the ASME Code symbol must be determined by the applicable sections of the code under which it was constructed and stamped. Subject to the concurrence of the department, the boiler may be re-rated in accordance with the rules of a later edition of the ASME Code and in accordance with the rules of the National Board Inspection Code.

(B) The maximum allowable working pressure of a boiler which does not carry the ASME or the API-ASME Code symbol must be computed in accordance with the Inspection Code of the National Board of Boiler and Pressure Vessel Inspectors.

(C) This chapter must not be construed to prevent the use, the sale, or the reinstallation of a boiler referred to in this section if the boiler has been made to conform to the regulations of the department governing existing installations and has not been found upon inspection to be in an unsafe condition.

Section 41-14-60. (A) This chapter does not apply to:

(1) boilers under federal control or under regulations of Title 49 of the Code of Federal Regulations, Parts 192 and 193;

(2) hot water supply boilers equipped with ASME-National Board approved safety relief valves which are directly fired with oil, gas, or electricity when none of the following limitations are exceeded: heat input of 200,000 BTU per hour; water temperature of 210 degrees Fahrenheit; nominal water-containing capacity of 120 gallons;

(3) boilers in the care, custody, and control of research facilities and used solely for research purposes which require one or more details of noncode construction or which involve destruction or reduced life expectancy of those vessels so long as a timely inspection report is filed pursuant to Section 41-14-120;

(4) boilers operated and maintained for the production and generation of electricity so long as a timely inspection report is filed pursuant to Section 41-14-120;

(5) boilers operated and maintained as part of a manufacturing process so long as a timely inspection report is filed pursuant to Section 41-14-120;

(6) boilers that are subject to OSHA standards of compliance so long as a timely inspection report is filed pursuant to Section 41-14-120;

(7) boilers operated and maintained by a public utility or the Public Service Authority including, but not limited to, boilers operated and maintained for the production of electricity so long as a timely inspection report is filed pursuant to Section 41-14-120.

(B) The following boilers are exempt from the requirements of Sections 41-14-120 and 41-14-130:

(1) boilers that are located on farms and used solely for agricultural or horticultural purposes;

(2) heating boilers that are located in private residences or in apartment houses of less than six family units.

(C) All pressure vessels are exempt from regulation under this chapter.

Section 41-14-70. (A) The director shall appoint a chief boiler administrator who has passed the same type of examination prescribed in Section 41-14-90.

(B) The director must be charged, directed, and empowered to:

(1) take action necessary for the enforcement of the laws and regulations of this State regulating the use of boilers;

(2) keep a complete record of the name of each boiler owner or user and his or her location, the type, dimensions, maximum allowable working pressure, age, and the last record inspection of all boilers; and

(3) publish and make available, upon request, copies of the department regulations.

Section 41-14-80. (A) The director shall promulgate regulations for the certification of special inspectors. Before receiving his certificate of competency, each inspector shall satisfactorily pass the examination provided for in Section 41-14-90 or, in lieu of the examination, shall hold a commission or a certificate of competency as an inspector of boilers from a state that has a standard of examination substantially equal to that of this State or possess a commission as an inspector of boilers issued by the National Board of Boiler and Pressure Vessel Inspectors.

(B) The expenses or salary of special inspectors must not be paid by the State.

(C) The special inspectors may inspect all boilers insured or operated by their respective companies.

Section 41-14-90. The examination for chief boiler administrator or special inspectors must be in accordance with the requirements of the National Board of Boiler and Pressure Vessel Inspectors.

Section 41-14-100. The board shall discipline certified inspectors in the manner authorized by Chapter 1, Title 40. The Department of Labor, Licensing and Regulation on behalf of the board shall investigate complaints and reports of violations of this chapter as provided for in Chapter 1, Title 40. In addition to other remedies provided for in this chapter, the board in accordance with Chapter 1, Title 40 may issue a cease and desist order or may petition the Administrative Law Court for equitable relief to enjoin a violation of this chapter.

Section 41-14-110. If a certificate of competency is lost or destroyed, a duplicate certificate of competency must be issued without further examination.

Section 41-14-120. (A) Owners and operators of all boilers must file with the department evidence of timely inspection as provided in this section. Evidence of timely inspection may be in the form of a certification of insurance, which contains evidence that the boiler was inspected and approved or it may be an inspection report from a certified special inspector.

(B) The director or the chief boiler administrator shall give twenty-four hours' notice to enter any premises in the State where a boiler is being installed or repaired for the purpose of ascertaining whether the boiler is being installed or repaired in accordance with the provisions of this chapter.

(C)(1) After December 31, 2005, each boiler used, or proposed to be used in this State must be thoroughly inspected as to their installation and condition as follows:

(a) Annually, a certificate inspection must be conducted on power boilers and high pressure, high temperature water boilers and this inspection must be an internal inspection; however, if it is not possible to perform an internal inspection, the inspection must be as complete an inspection as possible. The boilers must also be externally inspected while under pressure, if possible.

(b) Biennially a certificate inspection must be conducted on low pressure steam or vapor heating boilers and an internal inspection must be conducted every four years where installation permits.

(c) Biennially a certificate inspection must be conducted on hot water heating and hot water supply boilers and an internal inspection must be conducted at the discretion of the inspector.

(2) A grace period of two months beyond the periods specified in items (a) and (b) of subsection (B)(1) may elapse between certificate inspections.

(3) The department may provide for longer periods between certificate inspection in its regulations.

(4) Pursuant to this chapter, the department has jurisdiction over the interpretation and application of the inspection requirements as provided for in regulations of the board. The person conducting the inspection during installation or repair shall certify as to the minimum requirements for safety as defined in the ASME Code. Inspection requirements of operating equipment must be in accordance with generally accepted practice and compatible with the actual service conditions, which must include all of the following:

(a) previous experience, based on records of inspection, performance, and maintenance;

(b) quality of inspection and operating personnel;

(c) provisions for related safe operation controls;

(d) interrelation with other operations.

(5) The department may permit variations in the inspection requirements based upon documentation of the actual service conditions by the owner or user of the operating equipment.

(C) The inspections required in this chapter must be made by a special inspector provided for in this chapter.

(D) If the inspector determines that a hydrostatic test is necessary, it must be made by the owner or user of the boiler.

Section 41-14-130. (A) If a report filed pursuant to this section shows that a boiler fails to comply with the regulations of the department, the department may issue a written order directing that the deficiencies be corrected and setting a date for correction.

(B) The department may issue a written order for the temporary cessation or operation of a boiler because of faulty installation or incorrect repair if the boiler has been determined after inspection to be hazardous or unsafe. Operations must not resume until the conditions are corrected to the satisfaction of the director or his designee.

Section 41-14-140. (A) Any person or entity that fails to comply with the provisions of this chapter or the regulations promulgated pursuant to this chapter may be assessed a civil penalty of not more than five thousand dollars for each violation. When considering

the assessment of penalties, consideration must be given to the good faith actions of and the history of prior violations by the person or entity as well as any other relevant circumstances.

(B) Any person or entity that fails to timely comply after written notice by the department of a violation is subject to a penalty of up to one hundred dollars per day for such noncompliance.

Section 41-14-150. A fee not to exceed fifty dollars per facility or per certificate filed with the department in the format prescribed by regulation may be assessed, collected, and adjusted by the Department of Labor, Licensing and Regulation in accordance with Chapter 1, Title 40."

Subclassification licensure requirements

SECTION 2. Section 40-11-410(4)(o) of the 1976 Code is amended to read:

"(o) 'Boiler installation' which includes those who are qualified to install, repair, and service boilers and boiler piping including the boiler auxiliary equipment, controls, and actuated machinery and dryer rolls. To qualify for this subclassification, a person must pass a technical examination administered by the board or must be the holder of the American Society of Mechanical Engineers (ASME) 'S' stamp or hold the National Board of Boiler and Pressure Vessel Inspectors (NBBPVI) 'R' stamp and meet the requirements for licensure according to this chapter."

Severability

SECTION 3. If any section, subsection, paragraph, subparagraph, sentence, clause, phrase, or word of this act is for any reason held to be unconstitutional or invalid, such holding shall not affect the constitutionality or validity of the remaining portions of this act, the General Assembly hereby declaring that it would have passed this article, and each and every section, subsection, paragraph, subparagraph, sentence, clause, phrase, and word thereof, irrespective of the fact that any one or more other sections, subsections, paragraphs, subparagraphs, sentences, clauses, phrases, or words hereof may be declared to be unconstitutional, invalid, or otherwise ineffective.

APPLICATION

71-9100 Requirement of filing inspection report to claim exemption.

Boilers described in S.C. Code 41-14-60(3), (4), (5), (6), and (7) may claim exemption from these regulations by filing with the Department an inspection report indicating that the boiler has been inspected at the appropriate frequency. The inspection report may be in the form of a report of inspection from a certified special inspector. The inspection report may also be in the form of a certification of insurance which identifies the boiler as required by S.C. Code 41-14-70(2) and contains evidence that the boiler has been inspected at the appropriate frequency and approved by the insurer.

DEFINITIONS

71-9101 Definitions.
For the purposes of this Chapter all definitions from the Boiler Safety Act apply. In addition the following definitions apply.

1. 'Act' means the Boiler and Pressure Vessel Safety Act, which were enacted as Title 41, Chapter 14, of the S.C. Code of Laws.
2. 'Alteration' means any change in the item described on the original Manufacturer's Data Report which affects the pressure-containing capability of the boiler or pressure vessel. Nonphysical changes such as an increase in the maximum allowable working pressure (internal or external) or design temperature of a boiler shall be considered an alteration. A reduction in minimum temperature such that additional mechanical tests are required shall also be considered an alteration.
3. 'Approved' means approved by the Department of Labor, Licensing and Regulation.
4. 'ASME Code' means The Boiler and Pressure Vessel Code published by the American Society of Mechanical Engineers, including addenda and code cases approved by the council of that Society.
5. 'Authorized Inspection Agency' means one of the following:

a. New Construction: An Authorized Inspection Agency is one that meets the qualification and definition of NB-360, Criteria for Acceptance of Authorized Inspection Agencies for New Construction.

b. Inservice: An Authorized Inspection Agency is either:

i. a jurisdictional authority as defined in the National Board Constitution, or

ii. an entity that is accredited in accordance with NB-369, Qualifications and Duties for Authorized Inspection Agencies (AIAs) Performing Inservice Inspection Activities and Qualifications for Inspectors of Boilers and Pressure Vessels.

6. 'Special Inspector Certificate' means a certificate issued by the Department to a person who meets the requirements of the S.C. Code 41-14-80 and these regulations.
7. 'Internal Inspection' means as complete an examination as can reasonably be made of the internal and external surfaces of a boiler while it is shut down, and manhole plates, handhold plates or other inspection-opening closures are removed as required by the inspector.
8. 'External Inspection' means an inspection made when a boiler is in operation, if possible.

9. ‘Commission; National Board’ means the commission issued by The National Board of Boiler and Pressure Vessel Inspectors to a holder of a certificate of competency who desires to make shop inspections or field inspections in accordance with the National Board bylaws and whose employer submits the inspector’s application to the National Board for such commission.
10. ‘Condemned Boiler’ means a boiler that has been inspected and declared unsafe or disqualified by legal requirements by an inspector, and a stamping or marking has been applied by the chief or a special inspector designating its condemnation.
11. ‘Existing Installation’ means includes any boiler constructed, installed, placed in operation, or contracted for before December 31, 2005.
12. ‘Hot Water Storage Tank’ means a closed vessel connected to a water heater used exclusively to contain potable water.
13. ‘Lined Potable Water Heater’ means a water heater with a corrosion-resistant lining used to supply potable hot water.
14. ‘National Board’ means the National Board of Boiler and Pressure Vessel Inspectors (NB), 1055 Crupper Avenue, Columbus, Ohio 43229, whose membership is composed of the chief boiler administrators of jurisdictions who are charged with the enforcement of the provisions of the Boiler and Pressure Vessel Safety Act.
15. ‘National Board Inspection Code Ansi/Nb-23’ means the code for jurisdictional authorities, inspectors, users, and organizations performing repairs and alterations to pressure-retaining items; published by the National Board.
16. ‘National Board Commission’ means a certificate issued by the National Board to an individual who has passed the National Board Examination, who holds a valid certificate of competency and who is regularly employed by an Authorized Inspection Agency.
17. ‘National Board Commissioned Inspector’ means an individual who holds a valid Certificate of Competency to perform in-service, repair and alteration inspections as defined by the National Board Inspection Code; holds a National Board commission; and is regularly employed as an inspector by an Authorized Inspection Agency.
18. ‘New Boiler Installation’ means includes all boilers constructed, installed, placed in operation or contracted for after December 31, 2005.
19. ‘Nonstandard Boiler’ means a boiler that does not bear a stamp acceptable to South Carolina, or otherwise does not comply with the Act or stated rules and regulations of this state.
20. ‘Original Code of Construction’ means documents promulgated by recognized national standards-writing bodies that contain technical requirements for construction of pressure retaining items or equivalent to which the original manufacturer certified the pressure-retaining item.
21. ‘Owner or User’ means any person, firm, or corporation legally responsible for the safe installation, operation, and maintenance of any boiler within South Carolina.
22. ‘Pressure-Retaining Item (PRI)’ means any boiler, pressure vessel, piping, or material used for the containment of pressure, either internal or external. The pressure may be obtained from an external source, or by the application of heat from a direct source, or any combination thereof.
23. ‘PSIG’ means pounds per square inch gauge.
24. ‘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.
25. ‘Relief valve’ means a pressure relief valve actuated by inlet static pressure having a gradual lift generally proportional to the increase in pressure over opening pressure. It may be provided with an enclosed spring housing suitable for closed discharge system application and is primarily used for liquid service.

26. ‘Repair’ means the work necessary to restore a pressure-retaining item to a safe and satisfactory operating condition.
27. ‘Repair/Pressure Relief valve’ means the replacement, re-machining, or cleaning of any critical part, lapping of seat and disk, or any other operation, which may affect the flow passage, capacity function, or pressure-retaining ability of the valve. Disassembly, reassembly, and/or adjustments, which affect the pressure relief valve function are also considered a repair.
28. ‘Safety Relief valve’ means depending on application, a pressure relief valve characterized by rapid opening or pop action, or by opening in proportion to the increase in pressure over opening pressure.
29. ‘Safety valve’ means a pressure relief valve actuated by inlet static pressure and characterized by rapid opening or pop action.
30. ‘Secondhand Boiler’ means a boiler, which has changed both location and ownership since primary use.
31. ‘Standard Boiler’ means a boiler which bears the stamp of South Carolina, the ASME stamp, the API/ASME stamp, both the ASME and National Board stamp, or the stamp of another jurisdiction which has adopted a standard of construction equivalent to that required by the Board.
32. ‘Water Heater’ means a closed vessel used to supply potable hot water which is heated by the combustion of fuels, electricity, or any other source and withdrawn for use external to the system at pressures not exceeding 160 psig, or a heat input of 200,000 BTU per hour, and shall include all controls and devices necessary to prevent water temperatures from exceeding 210 degrees Fahrenheit.

SUBARTICLE II.
ADMINISTRATION

71-9102. Administration.

A. Minimum Construction Standards for Boilers

1. All new boilers installed and operated in South Carolina, unless otherwise exempted, shall be designed and constructed in accordance with the ASME Code or a nationally recognized Code of Construction accepted by South Carolina. All new boilers installed in South Carolina shall be marked in accordance with the Code of Construction and shall be registered in accordance with NB-264, Criteria for Registration of Boilers, Pressure Vessels and Other Pressure-Retaining Items, or listed in accordance with NB-265, Criteria for Listing of Boilers, Pressure Vessels and Other Pressure-Retaining Items Not Registered with the National Board. Pressure-relieving devices shall be constructed to the ASME Code and certified by the National Board in accordance with NB-500, Criteria for Certification of Pressure Relief Devices. Copies of registration or listing documents shall be provided to the chief boiler administrator when requested.

2. State Special – a boiler that is of special design and construction where the owner has demonstrated that the special design and construction will provide an equivalent degree of safety to that of conformance with these regulations.

3. An application for permission to install a second hand boiler shall be filed before the owner or user installs the boiler with the chief boiler administrator and his/her approval obtained.

B. Frequency of Inspections of Boilers

1. Except as permitted in (a.) below, power boilers and high-temperature water boilers shall receive an inspection annually which shall be an internal inspection where construction permits; otherwise, it shall be as complete an inspection as possible. Such

boilers shall also be inspected externally annually while under normal operating conditions.

a. Alternative internal inspection requirements:

i. Fully attended power boilers and high-temperature boilers are extended to thirty-six (36) months provided that the following requirements are met:

(a). Continuous boiler water treatment under the direct supervision of persons trained and experienced in water treatment for the purpose of controlling and limiting corrosion and deposits.

(b). Record-keeping available for review, showing:

(1) The date and time the boiler is out of service and the reason therefore.

(2) Daily analysis of water samples that adequately show the conditions of the water and elements or characteristics that are capable of producing corrosion or other deterioration to the boiler or its parts.

(c). Controls, safety devices, instrumentation, and other equipment necessary for safe operation are up-to-date, in service, calibrated, and meet the requirements of an appropriate safety code for that size boilers, such as NFPA 85, ASME CSD-1 Controls and Safety Devices for Automatically Fired Boilers, National Board Inspection Code ANSI/NB-23, jurisdictional requirements, and are not compromised.

2. Low-pressure boilers, water heaters, and hot water storage tanks covered by these rules and regulations shall receive an inspection biennially.

a. Steam or vapor boilers shall have an external inspection and an internal inspection every two years where construction permits;

b. Hot water heating and hot water supply boilers shall have an external inspection biennially and, where construction permits, an internal inspection at the discretion of the inspector;

c. Water heaters, including hot water storage tanks, shall have an external inspection every two years, which shall include the function of all controls and devices.

3. Based upon documentation of actual service conditions by the owner or user of the operating equipment, the Department of Labor, Licensing and Regulation may, in its discretion, permit variations in the inspection frequency requirements as provided in the Act.

4. Historical boilers, defined as steam boilers of riveted construction, preserved, restored, or maintained for hobby or demonstration use, shall be subjected to an initial inspection followed by an inspection every three (3) years thereafter if stored inside a shelter and annually if stored outdoors. The initial inspection shall include ultrasonic thickness testing of all pressure boundaries. All thinned areas shall be monitored and recorded on the inspection report.

C. Notification of Inspection

1. Inspections shall be carried out at a time mutually agreeable to the inspector and owner or user.

2. The inspector may perform external inspections during reasonable hours and without prior notification.

3. When, as a result of external inspection or determination by other objective means, it is the inspector’s opinion that continued operation of the boiler constitutes a menace to public safety, the inspector may request an internal inspection or an appropriate pressure test, or both, to evaluate conditions. In such instances, the owner or user shall prepare the boiler, pressure vessel or nuclear system for such inspections or tests as the inspector may designate.

D. Examination for a Special Inspector's Certificate

1. An applicant for certification as a special inspector shall have qualifications as required by S.C. Code Section 41-14-80. Examination may be taken at any site approved by the National Board of Boiler and Pressure Vessel Inspectors.

2. The request for certification as a Special Inspector shall be completed on forms to be provided by the Department.

3. Each Special Inspector's certificate shall remain in effect until cancelled by the Department so long as the national commission (or other underlying state commission) is current. Failure to respond to a request for commission information shall result in immediate cancellation of the certificate.

E. Conflict of Interest

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

F. Initial Inspection Reports to be Submitted by Special Inspectors or by the insurer:

1. Special Inspectors or the insurer shall submit an initial inspection report on a form approved by the department (or on a Form NB-5). The owner must have a special inspector or insurer submit this report within one year of the effective date of these rules and regulations.

2. Inspection reports shall be submitted within 30 days from date of completion of the inspection.

3. The Special Inspector or insurer shall forward a copy of the inspection report to the boiler user location within 30 days from the date of inspection. If the boiler fails the inspection, the Special Inspector or insurer shall submit a report to the boiler user location within 10 days of the inspection.

4. To initially register the boiler, the Special Inspector or insurer shall affix a department issued boiler registration number. The registration number shall be placed in a conspicuous position and visible to any inspector.

G. Special Inspectors to Notify Chief Boiler Administrator of Unsafe Boilers

If a special inspector finds a boiler to be unsafe for further operation, the special inspector shall promptly notify the owner or user, stating what repairs or other corrective measures are required to bring the object into compliance with these rules and regulations. Unless the owner or user makes such repairs or adopts such other corrective measures promptly, the special inspector shall immediately notify the chief boiler administrator who may issue a written order for the temporary cessation of operation of the boiler. When re-inspection establishes that the necessary repairs have been made or corrective actions have been taken and that the boiler is safe to operate, the chief boiler administrator shall be notified. At that time, the order for temporary cessation of operation will be rescinded.

H. Defective Conditions Disclosed at Time of External Inspection

If, upon an external inspection, there is evidence of a leak or crack, sufficient covering of the boiler shall be removed to permit the inspector to satisfactorily determine the safety of the boiler. If the covering cannot be removed at that time, he/she may order the operation of the boiler stopped until such time as the covering can be removed and proper examination made.

I. Owner or User to Notify Chief Boiler Administrator of Accident

When an accident occurs to a boiler which results in personal injury to any person or results in the emergency shut-down of the boiler, the owner or user shall promptly notify

the chief boiler administrator and submit a detailed report of the accident. In the event of a personal injury or any explosion, notice shall be given immediately by telephone, or accepted means of electronic communication, and neither the boiler nor any parts thereof, shall be removed or disturbed before permission has been given by the Department of Labor, Licensing, and Regulation, except for the purpose of saving human life and limiting consequential damage. If the Department of Labor, Licensing, and Regulation cannot respond within 6 hours, the owner can proceed with repairs, but must document the as found conditions.

J. Filing of Subsequent Inspection Reports

1. If a boiler after inspection is found to be suitable and to conform to these rules and regulations, the owner or user shall file a copy of the inspection report or the certificate of insurance, which contains evidence identifying each boiler that was inspected and approved. Identifying evidence must include the boiler's national number, state number and physical location. This report may be made in an electronic format accepted by South Carolina or may be on a form approved by the department or on a Form NB-6 or 7.

2. The owner shall submit a filing fee in the amount of twenty five dollars per boiler. Checks and money orders for payment of inspection report fees shall be made payable to the Department of Labor, Licensing and Regulation – Boiler Safety Program.

K. Stamping/Restamping of Boilers

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

2. When the stamping on a boiler becomes indistinct, the inspector shall instruct the owner or user to have it re-stamped. Request for permission to re-stamp the boiler shall be made to the chief boiler administrator and proof of the original stamping shall accompany the request. The chief boiler administrator may grant such authorization. Re-stamping authorized by the Department of Labor, Licensing and Regulation shall be done only in the presence of a person holding a National Board Commission and shall be identical with the original stamping except for the ASME Code symbol stamp. Notice of completion of such stamping shall be filed with the chief boiler administrator by the inspector who witnessed the stamping on the boiler together with a facsimile of the stamping applied.

L. Condemned Boilers

Any boiler having been inspected and declared unfit for further service by an inspector shall be stamped by the chief boiler administrator on either side of the South Carolina identification number with the letters "XXX" as shown by the preceding facsimile, which will designate a condemned boiler.

M. Reinstallation of Boilers Moved Outside the Jurisdiction

When a standard boiler located within South Carolina is to be moved outside the state for temporary use or for repair, alteration, or modification, application shall be made by the owner or user to the chief boiler administrator for permission to reinstall the boiler in South Carolina. When a nonstandard boiler is removed from South Carolina, it shall not be reinstalled within the state.

N. Installation of Used or Secondhand Boilers

Before a used or secondhand boiler may be shipped for installation in South Carolina, an inspector holding a valid National Board commission must make an inspection, and the owner or user of the boiler shall file data submitted by him/her with the chief boiler administrator and with the local building official. Such boilers when installed in South Carolina shall be equipped with fittings and appurtenances that comply with the rules and regulations for new installations.

O. Reinstalled Boilers

When a stationary boiler is moved and reinstalled within South Carolina, the attached fittings and appurtenances shall comply with these rules and regulations for new installations.

P. Working Pressure for Existing Installations

Any inspector may decrease the working pressure on any existing installation if the condition of the boiler warrants it. If the owner or user does not concur with the inspector's decision, the owner or user may appeal to the Department.

Q. Safety Appliances

1. No person shall attempt to remove or do any work on any safety appliance prescribed by these rules and regulations while the appliance is subject to pressure.

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

3. No person shall alter any safety or safety relief valves or pressure relief devices in any manner to maintain a working pressure in excess of that stated on the report of the boiler or pressure vessel inspection.

R. Application of Serial Numbers

1. Upon completion of the installation of a boiler, or at the time of the initial inspection of an existing installation, each boiler shall be identified by a number unique to that item.

S. Variations

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

2. A copy of the application for variation shall be given by the owner or use to affected employees and to the local fire authority, who shall be given adequate opportunity to respond in writing and to appear and offer evidence at any hearing.

3. When there is a reason to believe, or upon receipt of a complaint that a variation does not provide freedom from danger equivalent to the published rule or regulation, the Department after notice to the owner or user to the complainant and to the affected employees and the local fire authority and after such hearing and investigation as it may direct, may continue to reaffirm, suspend, revoke, or modify the conditions specified in any variation. No declaration, act, or omission of the Department, chief boiler administrator, or special inspectors, other than a written order authorizing a

variation as permitted above, shall be deemed to exempt, either wholly or in part, expressly or implied, any owner or user from full compliance with the terms of any rule or regulation.

T. Temporary or Leased Boilers

The owner of a leased boiler shall provide to any person who leases it, documentation that the boiler is registered in accordance with NB-264 or 265 and a copy of its most recent inspection report, showing that it has been inspected according to the frequency provided in the act. South Carolina will recognize inspection reports by inspectors with valid commission from other jurisdictions.

SUBARTICLE III.
EXISTING INSTALLATION

All special inspectors shall apply the following standards to existing installations in South Carolina.

71-9103.1. Power Boilers.

A. EBO-1 Age Limit of Existing Boilers

1. The age limit of any boiler of nonstandard construction, installed prior to the date the Act became effective, shall be 30 years, except that a boiler having other than a lap-riveted longitudinal joint, after a thorough internal and external inspection and, when required by the inspector, a pressure test of 1-1/2 times the allowable working pressure held for a period of at least 30 minutes during which no distress or leakage develops, may be continued in operation at the working pressure determined by EB0-3. 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 reinstalled for a pressure in excess of 15 psig. A reasonable time for replacement, not to exceed one year, may be given at the discretion of the Board.

2. The age limit of boilers of standard construction installed prior to the date this law became effective shall be dependent on thorough internal and external inspection and, where required by the inspector, a 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 EB0-2.

3. The shell or drum of a boiler in which a lap seam crack develops along a longitudinal lap riveted joint shall be condemned. A lap seam crack is a crack found in lap seams extending parallel to the longitudinal joint and located either between or adjacent to rivet holes.

B. EB0-2 Maximum Allowable Working Pressure for Standard Boilers

The maximum allowable working pressure for standard boilers shall be determined in accordance with the applicable provisions of the edition of the ASME Code under which they were constructed and stamped.

C. EB0-3 Maximum Allowable Working Pressure for Nonstandard Boilers

1. The maximum allowable working pressure for boilers fabricated by riveting shall be determined by the applicable rules of the 1971 Edition of Section I of the ASME Code. The lowest factor of safety permissible on existing installations shall be 5.0, except for horizontal-return-tubular boilers having continuous longitudinal lap seams more than

12 ft. in length, where the factor of safety shall be 8. When this latter type of boiler is removed from its existing setting, it shall not be reinstalled for pressures in excess of 15 psig.

2. The maximum allowable working pressure for boilers of welded construction in service may not exceed that allowable in Section I of the ASME Code for new boilers of the same construction. The maximum allowable working pressure on the shell of a boiler or drum shall be determined by the strength of the weakest course computed from the thickness of the plate, the tensile strength of the plate, the efficiency of the longitudinal joint, the inside diameter of the course, and the factor of safety allowed by these rules in accordance with the following formula:

(TS)(t)(E)(R)(FS) = maximum allowable working pressure, psig where:

(TS) = specified minimum tensile strength of shell plate material, psi. When the tensile strength of steel or wrought-iron shell plate is not known, it shall be taken as 55,000 psi for steel and 45,000 psi for wrought iron

(t) = minimum thickness of shell plate, in weakest course, inches

(E) = efficiency of longitudinal joint, method of determining which is given in Paragraph PG-27 of Section I of the ASME Code

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

(FS) = factor of safety, which shall be at least 5.0

3. The inspector may increase the factor of safety, if the condition and safety of the boiler warrant it.

D. EB0-4 Cast-Iron Headers and Mud Drums

The maximum allowable working pressure on a water tube boiler, the tubes of which are secured to cast-iron or malleable iron headers, or which have cast-iron mud drums, shall not exceed 160 psig.

E. EB0-5 Pressure on Cast-Iron Boilers

The maximum allowable working pressure for any cast-iron boiler, except hot water boilers, shall be 15 psig. See EHB-1, 2, and 4.

F. EB0-6 Safety Valves

1. The use of weighted-lever safety valves or safety valves having either the seat or disk of cast-iron are prohibited; valves of this type of construction shall be replaced by direct, spring loaded, pop-type valves that conform to the requirements of ASME Code, Section 1.

2. Each boiler shall have at least one ASME/NB stamped and certified safety valve, and if it is a high pressure boiler with a high pressure more than 500 sq. ft. of water-heating surface, or an electric power input of more than 1,100 KW, it shall have two or more safety valves of the same type.

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

4. No valves of any description shall be placed between the safety valve and the boiler or on the escape pipe, if used. When an escape pipe is used, it shall be at least the full size of the safety valve discharge and fitted with an open drain to prevent water lodging in the upper part of the safety valve or in the escape pipe. When an elbow is placed on a safety valve escape pipe, it shall be located close to the safety valve outlet, or

the escape pipe shall be anchored and supported securely. All safety discharges shall be located and carried by a pipe clear from walkways or platforms.

5. The safety valve capacity of each boiler shall be such that the safety valve or valves will discharge all the steam that can be generated by the boiler without allowing the pressure to rise more than 6 percent above the highest pressure to which any valve is set, and in no case to more than 6 percent above the maximum allowable working pressure.

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

7. When boilers of different maximum allowable working pressures with minimum safety valve settings varying more than 6 percent are so connected that steam can flow toward the lower pressure units, the latter shall be protected by additional safety valve capacity, if necessary, on the lower pressure side of the system. The additional safety valve capacity shall be based upon the maximum amount of steam, which can flow into the lower pressure system.

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

9. The relieving capacity of the safety valves on any boiler shall be checked by one of the following three methods and, if found to be insufficient, additional valves shall be provided:

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

b. By measuring the maximum amount of fuel that can be burned and computing the corresponding evaporative capacity (steam-generating capacity) upon the basis of the heating value of this fuel. These computations shall be made as outlined in the Appendix of the ASME Code, Section l;

c. By measuring the maximum amount of feed water that can be evaporated.

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

G. EB0-7 Boiler Feeding

Each boiler shall have a feed supply, which will permit it to be fed at any time while under pressure. A boiler having more than 500 sq. ft. 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 6 percent greater than the set pressure of the safety valve with the highest setting may be considered one of the means. Boilers fed by gaseous, liquid, or solid fuel in suspension may be equipped with a single means of feeding water, provided means are furnished for the shutoff of heat input prior to the water level reaching the lowest safe level. The feed water shall be introduced into a boiler in such a manner that the water will not be discharged directly against surfaces exposed to gases of high temperature to direct radiation from the fire. For pressures of 400 psig or over, the feed

water inlet through the drum shall be fitted with shields, sleeves, or other suitable means to reduce the effects of temperature differentials in the shell or head. 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. In all cases where 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 to be placed between the boiler and the check valve, and both shall be located as close to the boiler as is practicable. It is recommended that no stop valves be placed in the supply and return pipe connections of a single boiler installation. Where deaerating heaters are not employed, it is recommended that the temperature of the feed water be not less than 120°F to avoid the possibility of setting up localized stress. Where deaerating heaters are employed, it is recommended that the minimum feed water temperature be not less than 215°F so that dissolved gases may be thoroughly released.

H. EB0-8 Water Level Indicators

1. Each boiler, except forced-flow steam generators with no fixed steam and waterline, and high temperature water boilers of the forced circulation type that have no steam and waterline, shall have at least one water gauge glass. Boilers operated at pressures over 400 psig shall be provided with two water gauge glasses which may be connected to a single water column or connected directly to the drum.

2. Two independent remote level indicators may be provided instead of one of the two required gauge glasses for boiler drum water level indication in the case of power boilers with all drum safety valves set at or above 900 psig. When both remote level indicators are in reliable operation, the remaining gauge glass may be shut off, but shall be maintained in serviceable condition.

3. When the direct reading of the gauge glass water level is not readily visible to the operator in his/her working area, two dependable indirect indications shall be provided, either by transmission of the gauge glass image or by remote level indicators.

4. The lowest visible part of the water gauge glass shall be at least 2 in. above the lowest permissible water level, at which level there will be no danger of overheating any part of the boiler when in operation at that level. When remote level indication is provided for the operator in lieu of the gauge glass, the same minimum level reference shall be clearly marked.

5. Connections from the boiler to the remote level indicator shall be at least 3/4 in. pipe size to and including the isolation valve and from there to the remote level indicator at least 1/2 in. O.D. tubing. These connections shall be completely independent of other connections for any function other than water level indication. For pressures of 400 psig or over, lower connections to drums shall be provided with shields, sleeves, or other suitable means to reduce temperature differentials in the shells or heads.

6. Boilers of the horizontal fire tube type shall be set so that when the water is at the lowest reading in the water gauge glass, there shall be at least 3 in. of water over the highest point of the tubes, flues, or crown sheets.

7. Boilers of locomotives shall have at least one water glass provided with top and bottom shutoff cocks and lamp, and two gauge cocks for boilers 36 in. in diameter and under, and three gauge cocks for boilers over 36 in. in diameter.

8. The lowest gauge cock and the lowest reading of water glass shall not be less than 2 in. above the highest point of crown sheet on boilers 36 in. in diameter and under, nor less than 3 in. for boilers over 36 in. in diameter. These are minimum dimensions,

and on larger locomotives and those operating on steep grades, the height should be increased, if necessary, to compensate for change of water level on descending grades.

9. The bottom mounting for water glass and for water column if used must extend not less than 1-1/2 in. inside the boiler and beyond any obstacle immediately above it, and the passage therein must be straight and horizontal.

10. Tubular water glasses must be equipped with a protecting shield.

11. All connections on the gauge glass shall be not less than 1/2 in. pipe size. Each water gauge glass shall be fitted with a drain cock or valve having an unrestricted drain opening of not less than 1/4 in. diameter to facilitate cleaning. When the boiler operating pressure exceeds 100 psig, the glass shall be furnished with a connection to install a valved drain to the ash pit or other safe discharge point.

12. Each water gauge glass shall be equipped with a top and a bottom shutoff valve of such through-flow construction as to prevent stoppage by deposits of sediments. If the lowest valve is more than 7 ft. above the floor or platform from which it is operated, the operating mechanism shall indicate by its position whether the valve is open or closed. The pressure-temperature rating shall be at least equal to that of the lowest set pressure of any safety valve on the boiler drum and the corresponding saturated-steam temperature.

13. Straight-run globe valves shall not be used on such connections.

14. Automatic shutoff valves, if permitted to be used, shall conform to the requirements of Section I of the ASME Code.

I. EBO-9 Water Columns

1. The water column shall be so mounted that it will maintain its correct position relative to the normal waterline under operating conditions.

2. The minimum size of pipes connecting the water column to a boiler shall be 1 in. For pressures of 400 psig or over, lower water column connections to drums shall be provided with shields, sleeves, or other suitable means to reduce the effect of temperature differentials in the shells or heads. Water glass fittings or gauge cocks may be connected directly to the boiler.

3. The steam and water connections to a water column or a water gauge glass shall be such that they are readily accessible for internal inspection and cleaning. Some acceptable methods of meeting this requirement are by providing a cross or fitting with a back outlet at each right-angle turn to permit inspection and cleaning in both directions, or by using pipe bends or fittings of a type which does not leave an internal shoulder or pocket in the pipe connection and with a radius of curvature which will permit the passage of a rotary cleaner. Screwed plug closures using threaded connections as allowed by Section I of the ASME Code are acceptable means of access for this inspection and cleaning. For boilers with all drum safety valves set at or above 400 psig, socket-welded plugs may be used for this purpose in lieu of screwed plugs. The water column shall be fitted with a connection for a drain cock or drain valve to install a pipe of at least 3/4 in. pipe size to the ash pit or other safe point of discharge. If the water connection to the water column has a rising bend or pocket, which cannot be drained by means of the water column drain, an additional drain shall be placed on this connection in order that it may be blown off to clear any sediment from the pipe.

4. The design and material of a water column shall comply with the requirements of Section I of the ASME Code. Water columns made of cast iron in accordance with SA-278 may be used for maximum boiler pressures not exceeding 250 psig. Water columns made of ductile iron in accordance with SA-395 may be used for maximum boiler pressures not exceeding 350 psig. For higher pressures, steel construction shall be used.

5. Shutoff valves shall not be used in the pipe connections between a boiler and a water column or between a boiler and the shutoff valves required for the gauge glass, unless they are either outside-screw-and-yoke or lever-lifting-type gate valves or stopcocks with lever permanently fastened thereto and marked in line with their passage, or of such other through-flow construction as to prevent stoppage by deposits of sediment, and to indicate by the position of the operating mechanisms whether they are in open or closed position; and such valves or cocks shall be locked or sealed open. Where stopcocks are used, they shall be of a type with the plug held in place by a guard or gland.

6. No outlet connections, except for control devices (such as damper regulators and feed water regulators), drains, steam gauges, or apparatus of such form as does not permit the escape of an appreciable amount of steam or water there from, shall be placed on the pipes connecting a water column or gauge glass to a boiler.

J. EB0-10 Gauge Glass Connections

Gauge glasses and gauge cocks that are not connected directly to a shell or drum of the boiler shall be connected by one of the following methods:

1. The water gauge glass or glasses and gauge cocks shall be connected to an intervening water column.

2. When only water gauge glasses are used, they may be mounted away from the shell or drum and the water column omitted, provided the following requirements are met.

a. The top and bottom gauge glass fittings are aligned, supported, and secured so as to maintain the alignment of the gauge glass;

b. The steam and water connections are not less than 1 in. pipe size and each water glass is provided with a valved drain; and

c. The steam and water connections comply with the requirements of the following:

i. the lower edge of the steam connection to a water column or gauge glass in the boiler shall not be below the highest visible water level in the water gauge glass. There shall be no sag or offset in the piping which will permit the accumulation of water; and

ii. the upper edge of the water connection to a water column or gauge glass and the boiler shall not be above the lowest visible water level in the gauge glass. No part of this pipe connection shall be above the point of connection at the water column.

3. Each boiler (except those not requiring water level indicators) shall have three or more gauge cocks located within the visible length of the water glass, except when the boiler has two water glasses located on the same horizontal lines.

4. Boilers not over 36 in. in diameter in which the heating surface does not exceed 100 sq. ft. need have but two gauge cocks.

5. The gauge cock connections shall be not less than 1/2 in. pipe size.

K. EB0-11 Pressure Gauges

Each boiler shall have a pressure gauge so located that it is easily readable. The pressure gauge shall be installed so that it shall at all times indicate the pressure in the boiler. Each steam boiler shall have the pressure gauge connected to the steam space or to the water column or its steam connection. A valve or cock shall be placed in the gauge connection adjacent to the gauge. An additional valve or cock may be located near the boiler, providing it is locked or sealed in the open position. No other shutoff valves shall be located between the gauge and the boiler. The pipe connection shall be of ample size and arranged so that it may be cleared by blowing out. For a steam boiler, the gauge or

connection shall contain a siphon or equivalent device, which will develop and maintain a water seal that will prevent steam from entering the gauge tube. Pressure gauge connections shall be suitable for the maximum allowable working pressure and temperature but if the temperature exceeds 406°F, brass or copper pipe or tubing shall not be used. The connections to the boiler, except the siphon (if used), shall not be less than 1/4 in. inside diameter standard pipe size. But where steel or wrought iron pipe or tubing is used they shall not be less than 1/2 in. The minimum size of a siphon (if used) shall be 1/4 in. inside diameter. The dial of the pressure gauge shall be graduated to approximately double the pressure at which the safety valve is set, but in no case to less than 1-1/2 times this pressure. Each forced-flow steam generator with no fixed steam and waterline shall be equipped with pressure gauges or other pressure-measuring devices located as follows:

1. At the boiler or super heater outlet (following the last section which involves absorption of heat).

2. At the boiler or economizer inlet (preceding any section which involves absorption of heat).

3. Upstream of any shutoff valve, which may be used between any two sections of the heat-absorbing surface.

Each high-temperature water boiler shall have a temperature gauge so located and connected that it shall be easily readable. The temperature gauge shall be installed so that it, at all times, indicates the temperature in degrees Fahrenheit of the water in the boiler, at or near the outlet connection.

L. B0-12 Stop Valves

1. 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.

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

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

M. EB0-13 Blow Off Piping

1. A blow off as required herein is defined as a pipe connection provided with valves located in the external piping through which the water in the boiler may be blown out under pressure, excepting drains such as are used on water columns, gauge glasses, or piping to feed water regulators, etc., used for the purpose of determining the operating conditions of such equipment. Piping connections used primarily for continuous operation, such as de-concentrators on continuous blow down systems, are not classed as blow offs, but the pipe connections and all fittings up to and including the first shutoff valve shall be equal at least to the pressure requirements for the lowest set pressure of any safety valve on the boiler drum and with the corresponding saturated-steam temperature.

2. A surface blow off shall not exceed 2-1/2 in. pipe size, and the internal pipe and the terminal connection for the external pipe, when used, shall form a continuous passage, but with clearance between their ends and arranged so that the removal of either will not disturb the other. A properly designed steel bushing, similar to or the equivalent

of those shown in Fig. PG-59.1 of Section I of the ASME Code, or a flanged connection shall be used.

3. Each boiler, except forced-flow steam generators with no fixed steam and waterline and high-temperature water boilers, shall have a bottom blow off outlet in direct connection with the lowest water space practicable for external piping conforming to PG-58.3.6 of Section I of the ASME Code.

4. All water walls and water screens which do not drain back into the boiler, and all integral economizers, shall be equipped with outlet connections for a blow off or drain line and conform to the requirements of PG-58.3.6 or PG-58.3.7 of the ASME Code.

5. Except as permitted for miniature boilers, the minimum size of pipe and fittings shall be 1 in., and the maximum size shall be 2-1/2 in., except that for boilers with 100 sq. ft. of heating surface or less; the minimum size of pipe and fittings may be 3/4 in.

6. Condensate return connections of the same size or larger than the size herein specified may be used, and the blow off may be connected to them. In such cases, the blow off shall be so located that the connection may be completely drained.

7. A bottom blow off pipe when exposed to direct furnace heat shall be protected by firebrick or other heat-resisting material, which is so arranged that the pipe may be inspected. An opening in the boiler setting for a blow off pipe shall be arranged to provide free expansion and contraction.

N. Repairs and Renewals of Boiler Fittings and Appliances

Whenever repairs are made to fittings or appliances or it becomes necessary to replace them, the work shall comply with the requirements for new installations.

O. EB0-15 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 boiler administrator for instructions concerning the requirements.

71-9103.2. Heating Boilers

A. EHB-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.

B. EHB-2 Nonstandard Riveted Boilers

The maximum allowable working pressure on the shell of a nonstandard riveted heating boiler shall be determined in accordance with EB0-3 of 71-9103.1.(C), except that in no case shall the maximum allowable working pressure of a steam-heating boiler exceed 15 psig, or a hot water boiler exceed 160 psig or 250°F temperature.

C. EHB-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, but in no case shall it exceed 30 psig.

D. EHB-4 Nonstandard Cast-Iron Boilers

1. 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.

2. 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.

E. EHB-5 Potable Water Heaters

A potable water heater shall not be installed or used at pressures exceeding 160 psig or water temperatures exceeding 210°F.

F. EHB-6 Safety Valves

1. Each steam boiler shall have one or more ASME/National Board-stamped 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 to prevent the valve from being disassembled 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 on the boiler. The manufacturer shall provide a body drain connection below seat level and this drain shall not be plugged during or after field inspection. For valves exceeding 2-1/2 in. pipe size, the drain hole or holes shall be tapped not less than 3/8 in. pipe size. For valves 2-1/2 in. in pipe size and smaller, the drain hole shall not be less than 1/4 in. in diameter.

2. No safety valve for a steam boiler shall be smaller than 1/2 in. No safety valve shall be larger than 4-1/2 in. The inlet opening shall have an inside diameter equal to, or greater than, the seat diameter.

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

4. The minimum valve capacity in pounds per hour shall be the greater of that determined by dividing the maximum BTU output at the boiler nozzle obtained by the firing of any fuel for which the unit is installed by 1,000, or shall be determined on the basis of the pounds of steam generated per hour per square foot of boiler heating surface as given in Table EHB-6. In many cases a greater relieving capacity of valves than the minimum specified by these rules will have to be provided. In every case, the requirements of EHB-6(5) shall be met.

TABLE EHB-6
Minimum Pounds of Steam Per Hour Per Square Foot of Heating Surface

	Fire tube Boilers	Water tube Boilers
Boiler Heating Surface:		
Hand-fired	5	6
Stoker-fired	7	8
Oil, gas, or pulverized fuel-fired	8	10
Water wall Heating Surface:		
Hand-fired	8	8
Stoker-fired	10	12
Oil, gas, or pulverized fuel-fired	14	16

a. When a boiler is gas fed and does not have a heat value in excess of 200 BTU per cu. ft., the minimum safety valve or safety relief valve relieving capacity may be based on the value given for hand fed boilers above.

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

c. For heating surface determination see ASME Code Section IV, Paragraph HG-403.

5. 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.

6. When operating conditions are changed, or additional boiler heating surface is installed, the valve capacity shall be increased, if necessary, to meet the new conditions and be in accordance with EHB-6(5). When additional valves are required, they may be installed on the outlet piping provided there is no intervening valve.

7. If there is any doubt as to the capacity of the safety valve, an accumulation test shall be run (See ASME Code, Section VI, Recommended Rules for Care and Operation of Heating Boilers).

8. No valve of any description shall be placed between the safety valve and the boiler, or on the discharge pipe between the safety valve and the atmosphere. The discharge pipe shall be at least full size and 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, it 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 so located or piped as not to endanger persons working in the area.

G. EHB-7 Safety Relief Valve Requirements for Hot Water Heating and Hot Water Supply Boilers

1. Each hot water heating and hot water supply boiler shall have at least one ASME/National Board-stamped and certified safety relief valve set to relieve at or below the maximum allowable working pressure of the boiler. Each hot water supply boiler shall have at least one ASME-National Board-stamped and certified safety relief valve of the automatic reseating type set to relieve at or below maximum allowable working pressure of the boiler. Safety relief valves ASME-National Board-stamped and certified as to capacity shall have pop action when tested by steam. When more than one safety relief valve is used on either a hot water heating or hot water supply boiler, the additional valve or valves shall be ASME National Board-stamped and certified and may be set within a range not to exceed 6 psig above the maximum allowable working pressure of

the boiler up to and including 60 psig and 5 percent for those having a maximum allowable working pressure exceeding 60 psig. Safety relief valves shall be spring-loaded. Safety relief valves shall be so arranged that they cannot be reset at a higher pressure than the maximum permitted by this paragraph.

2. No materials liable to fail due to deterioration or vulcanization when subject to saturated steam temperature corresponding to capacity test pressure shall be used for any part.

3. No safety relief valve shall be smaller than 3/4 in. nor larger than 4-1/2 in. standard pipe size, except that boilers having a heat input not greater than 15,000 BTU per hour may be equipped with a safety relief valve of 1/2 in. standard pipe size. The inlet opening shall have an inside diameter approximately equal to, or greater than, the seat diameter. In no case shall the minimum opening through any part of the valve be less than 1/4 in. in diameter or its equivalent area.

4. The required steam-relieving capacity, in pounds per hour, of the pressure relieving device or devices on a boiler shall be the greater of that determined by dividing the maximum output in BTU at the boiler nozzle obtained by the firing of any fuel for which the unit is installed by 1,000 or shall be determined on the basis of pounds of steam generated per hour per square foot of boiler heating surface as given in Table EHB-6. In many cases, a greater relieving capacity of valves will have to be provided than the minimum specified by these rules. In every case, the requirements of EHB-7(6) shall be met.

5. When operating conditions are changed, or additional boiler heating surface is installed, the valve capacity shall be increased, if necessary, to meet the new conditions and shall be in accordance with EHB-7(6). The additional valves required, on account of changed conditions, may be installed on the outlet piping provided there is no intervening valve.

6. Safety relief valve capacity for each boiler shall be such that, with the fuel burning equipment installed and operated at maximum capacity, the pressure cannot rise more than 10 percent above the maximum allowable working pressure. When more than one safety relief valve is used, the over-pressure shall be limited to 10 percent above the set pressure of the highest set valve allowed by EHB-6(1).

7. If there is any doubt as to the capacity of the safety relief valve, an accumulation test shall be run (See ASME Code, Section VI, Recommended Rules for Care and Operation of Heating Boilers).

8. No valve of any description shall be placed between the safety relief valve and the boiler, or on the discharge pipe between the safety relief valve and the atmosphere. The discharge pipe shall be not less than the diameter of the safety relief valve outlet and fitted with an open drain to prevent water lodging in the upper part of the safety relief valve or in the discharge pipe. When an elbow is placed on the safety relief valve discharge pipe, it shall be located close to the safety relief valve outlet, or the discharge pipe shall be securely anchored and supported. All safety relief valve discharges shall be so located or piped as not to endanger persons working in the area.

H. EHB-8 Steam Gauges

1. Each steam boiler shall have a steam gauge or a compound steam gauge connected to its steam space or to its water column or to its steam connection. The gauge or connection shall contain a siphon or equivalent device which will develop and maintain a water seal that will prevent steam from entering the gauge tube. The connection shall be so arranged that the gauge cannot be shut off from the boiler except by a cock placed in the pipe at the gauge and provided with a tee or lever handle arranged to be parallel to the pipe in which it is located when the cock is open. The connections to

the boiler shall be not less than 1/4 in. standard pipe size, but where steel or wrought-iron pipe or tubing is used, they shall be not less than 1/2 in. standard pipe size. The minimum size of a siphon, if used, shall be 1/4 in. inside diameter. Ferrous and nonferrous tubing having inside diameters at least equal to that of standard pipe sizes listed above may be substituted for pipe.

2. The scale on the dial of a steam boiler gauge shall be graduated to not less than 30 psig nor more than 60 psig. The travel of the pointer from 0 to 30 psig pressure shall be at least 3 in.

I. EHB-9 Pressure or Altitude Gauges and Thermometers

1. 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.

2. The scale on the dial of the pressure or altitude gauge shall be graduated approximately to not less than 1-1/2 nor more than three times the pressure at which the safety relief valve is set.

3. Piping or tubing for pressure or altitude-gauge connections shall be of nonferrous metal when smaller than 1 in. pipe size.

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

J. EHB-10 Water Gauge Glasses

1. Each steam boiler shall have one or more water gauge glasses attached to the water column or boiler by means of valved fittings not less than 1/2 in. pipe size, with the lower fitting provided with a drain valve of a type having an unrestricted drain opening not less than 1/4 in. in diameter to facilitate cleaning. Gauge glass replacement shall be possible under pressure. Water glass fittings may be attached directly to a boiler.

2. Boilers having an internal vertical height of less than 10 in. may be equipped with a water level indicator of the glass bull's-eye type provided the indicator is of sufficient size to show the water at both normal operating and low-water cutoff levels.

3. The lowest visible part of the water gauge glass shall be at least 1 in. above the lowest permissible water level recommended by the boiler manufacturer. With the boiler operating at this lowest permissible water level, there shall be no danger of overheating any part of the boiler.

4. Each boiler shall be provided at the time of manufacture with a permanent marker indicating the lowest permissible water level. The marker shall be stamped, etched, or cast in metal; or it shall be a metallic plate attached by rivets, screws, or welding; or it shall consist of material with documented tests showing its suitability as a permanent marking for the application. This marker shall be visible at all times. Where the boiler is shipped with a jacket, this marker may be located on the jacket.

5. In electric boilers of the submerged electrode type, the water gauge glass shall be so located to indicate the water levels both at startup and under maximum steam load conditions as established by the manufacturer.

6. In electric boilers of the resistance heating element type, the lowest visible part of the water gauge glass shall not be below the top of the electric resistance-heating element. Each boiler of this type shall also be equipped with an automatic low-water electrical power cutoff so located as to automatically cut off the power supply before the surface of the water falls below the top of the electrical resistance heating elements.

7. Tubular water glasses on electric boilers having a normal water content not exceeding 100 gal. shall be equipped with a protective shield.

K. EHB-11 Stop Valves

1. When a stop valve is used in the supply pipe connection of a single steam boiler, there shall be one used in the return pipe connection.

2. Stop valves in single hot water heating boilers shall be located at an accessible point in the supply and return pipe connections, as near the boiler nozzle as is convenient and practicable, to permit draining the boiler without emptying the system.

3. When the boiler is located above the system and can be drained without draining the system, stop valves may be eliminated.

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

5. All valves or cocks shall conform to the applicable portions of HF-203 of Section IV of the ASME Code and may be ferrous or nonferrous.

6. The minimum pressure rating of all valves or cocks shall be at least equal to the pressure stamped upon the boiler, and the temperature rating of such valves or cocks, including all internal components, shall be not less than 250°F.

7. Valves or cocks shall be flanged, threaded or have ends suitable for welding or brazing.

8. All valves or cocks with stems or spindles shall have adjustable pressure-type packing glands and, in addition, all plug-type cocks shall be equipped with a guard or gland. The plug or other operating mechanism shall be distinctly marked in line with the passage to indicate whether it is opened or closed.

9. All valves or cocks shall have tight closure when under boiler pressure test.

10. When stop valves are used, tags of metal or other durable material fastened to them shall properly designate them substantially.

L. EHB-12 Feed Water Connections

1. Feed water, makeup water, or water treatment shall be introduced into a boiler through the return piping system. Alternatively, makeup water or water treatment may be introduced through an independent connection. The water flow from the independent connection shall not discharge directly against parts of the boiler exposed to direct radiant heat from the fire. Makeup water or water treatment shall not be introduced through openings or connections provided for inspection or cleaning, safety valve, safety relief valve, blow off, water column, water gauge glass, pressure gauge, or temperature gauge.

2. The makeup 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 between the check valve and the return pipe system.

M. EHB-13 Water Column and Water Level Control Pipes

1. The minimum size of ferrous or nonferrous pipes connecting a water column to a steam boiler shall be 1 in. No outlet connections, except for damper regulator, feed water regulator, steam gauges, or apparatus which does not permit the escape of any steam or water except for manually operated blow downs, shall be attached to a water column or the piping connecting a water column to a boiler (see HG-705 of Section IV of the ASME Code for introduction of feed water into a boiler). If the water column, gauge glass, low-water fuel cutoff, or other water level control device is connected to the boiler by pipe and fittings, no shutoff valves of any type shall be placed in such pipe, and a cross or equivalent fitting to which a drain valve and piping may be attached shall be

placed in the water piping connection at every right-angle turn to facilitate cleaning. The water column drainpipe and valve shall be not less than 3/4 in. pipe size.

2. The steam connections to the water column of a horizontal fire tube wrought-iron boiler shall be taken from the top of the shell or the upper part of the head, and the water connection shall be taken from a point not above the centerline of the shell. For a cast-iron boiler, the steam connection to the water column shall be taken from the top of an end section or the top of the steam header, and the water connection shall be made on an end section not less than 6 in. below the bottom connection to the water gauge glass.

N. EHB-14 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.

O. EHB-15 Repairs and Renewals of Fittings and Appliances

Whenever repairs are made to fittings or appliances, or it becomes necessary to replace them, the repairs must comply with Section IV of the ASME Code for new construction.

SUBARTICLE IV.
GENERAL REQUIREMENTS

71-9104. General Requirements.

A. GR-1 Inspection of Boilers

All boilers not exempted by the Act or by rules and regulations promulgated under the Act and which are subject to regular inspections shall be prepared for such inspections as required in GR-2.

B. GR-2 Preparation for Inspection

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

1. Boilers – the owner or user shall prepare a boiler for internal inspection in the following manner:

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

b. 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;

c. All grates of internally fired boilers shall be removed if required by the inspector;

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

e. The pressure gauge shall be removed for testing as required by the inspector;

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

g. Before opening the manhole or hand hole covers and entering any parts of the steam-generating unit connected to a common header with other boilers, the non return and steam stop valves must be closed, tagged, and padlocked, and drain valves or cocks between the two valves opened. The feed valves must be closed, tagged, and

padlocked, and drain valves or cocks located between the two valves opened. After draining the boiler, the blow off valves shall be closed, tagged, and padlocked. Blow off lines, where practicable, shall be disconnected between pressure parts and valves. All drains and vent lines shall be opened.

C. GR-3 Boilers Improperly Prepared for Inspection

If a boiler has not been properly prepared for an internal inspection, or if the owner or user fails to comply with the requirements for a pressure test as set forth in these rules, the inspector may decline to make the inspection or test.

D. GR-4 Removal of Covering to Permit Inspection

If, upon an external inspection, there is evidence of a leak or crack, sufficient covering of the boiler shall be removed to permit the inspector to satisfactorily determine the safety of the boiler.

E. GR-5 Lap Seam Crack

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

F. GR-6 Pressure Test

1. A pressure test, when applied to boilers, need not exceed the maximum allowable working pressure or the setting of the lowest set safety valves. The pressure shall be under proper control so that in no case shall the required test pressure be exceeded. During a pressure test the safety valve or valves shall be removed or each valve disk shall be held to its seat by means of a testing clamp and not by screwing down the compression screw upon the spring. A plug device designed for this purpose may be used.

2. It is suggested that the minimum metal temperatures during a pressure test shall be not less than 70°F, and that the maximum metal temperature during inspection shall not exceed 120°F.

3. When a pressure test is applied to determine tightness, the pressure shall be equal to the normal operating pressure but need not exceed the release pressure of the safety valve having the lowest release setting.

4. When the contents of the vessel prohibit contamination by any other medium or when a water pressure test is not possible, other testing media may be used providing the precautionary requirements of the applicable section of the ASME Code are followed. In such cases, there shall be agreement between the owner and the inspector.

G. GR-7 Automatic Low-Water Fuel Cutoff and/or Water Feeding Device

1. Each automatically fired steam or vapor system boiler shall be equipped with an automatic low-water fuel cutoff so located as to automatically cut off the fuel supply when the surface of the water falls to the lowest safe waterline. If a water-feeding device is installed, it shall be so constructed that the water inlet valve cannot feed water into the boiler through the float chamber and so located as to supply requisite feed water. The lowest safe waterline should not be lower than the lowest visible part of the water glass.

2. Hot water heating boilers shall be equipped with a Low Water Fuel Cutoff with a manual reset function.

3. Such fuel or feed water control devices may be attached directly to a boiler or for low pressure boilers, to the tapped openings provided for attaching a water glass

directly to a boiler, provided that such connections from the boiler are nonferrous tees or Ys not less than 1/2 in. pipe size between the boiler and the water glass, so that the water glass is attached directly and as close as possible to the boiler; the straightway tapping of the Y or tee to take the water glass fittings, the side outlet of the Y or tee to take the fuel cutoff or water-feeding device. The ends of all nipples shall be reamed to full size diameter.

4. Designs embodying a float and float bowl shall have a vertical straightaway valve drain pipe at the lowest point in the water equalizing pipe connections by which the bowl and the equalizing pipe can be flushed and the device tested.

H. GR-8 Pressure Reducing Valves

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

2. The use of hand-controlled bypasses around reducing valves is permissible. If a bypass is used around the reduction valve, the safety valve required on the low pressure side shall be of sufficient capacity to relieve all the fluid that can pass through the bypass without over-pressuring the low-pressure side.

3. A pressure gauge shall be installed on the low-pressure side of a reducing valve.

I. GR-9 Boiler Blow Off Equipment

1. The blow down from a boiler or boilers that enters a sanitary sewer system or blow down, which is considered a hazard to life or property, shall pass through some form of blow off equipment that will reduce pressure and temperature as required hereinafter.

2. The temperature of the water leaving the blow off equipment shall not exceed 140°F.

3. The pressure of the blow down leaving any type of blow off equipment shall not exceed 5 psig.

4. All blow off equipment shall be fitted with openings to facilitate cleaning and inspection.

5. Blow off equipment shall conform to the provisions set forth in the recommended rules for Sizing Blow Off Vessels, 2004 Edition.

J. GR-10 Location of Discharge Piping Outlets

The discharge of safety valves, blow off pipes, and other outlets shall be located and supported as to prevent injury to personnel.

K. GR-11 Supports

Each boiler shall be supported by masonry or structural supports of sufficient strength and rigidity to safely support the boiler and its contents. There shall be no excessive vibration in either the boiler or its connecting piping.

L. GR-12 Boiler Door Latches

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

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

3. All other doors, except explosion doors, not used in the firing of the boiler, may be provided with bolts or fastenings in lieu of self-locking latching devices.

4. Explosion doors, if used and if located in the setting walls within 7 ft. of the firing floor or operating platform, shall be provided with substantial deflectors to divert the blast.

M. GR-13 Clearance

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

N. GR-14 Ladders and Runways

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

O. GR-15 Exit from Boiler Room

All boiler rooms exceeding a 500 sq. ft. floor area and containing one or more boilers having a fuel-burning capacity of 1,000,000 BTU, or equivalent electrical heat input, shall have at least two means of exit. Each exit shall be remotely located from the other. Each elevation in such boiler room shall have two means of exit, each remotely located from the other.

P. GR-16 Suggestions for Operations

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

Q. GR-17 Air and Ventilation Requirements – Combustion Air Supply and Ventilation of Boiler Room

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

1. The total requirements of all burners for all fired pressure vessels and air compressors or other air-consuming equipment in the boiler room must be used to determine the net louvered area in square feet:

INPUT BTU/HOUR	REQUIRED AIR CU/FT/MIN.	MIN. NET 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

2. When mechanical ventilation is in lieu of paragraph (A), the supply of combustion and ventilation air to the boiler room and 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 shown in paragraph (1) above.

R. GR-18 Gas Burners
For installations, which are gas fired, the burners used shall conform to the applicable requirements of nationally recognized standards.

S. GR-19 Conditions Not Covered by These Rules and Regulations
For any conditions not covered by these requirements, the applicable provisions of the ASME Code, the National Board Inspection Code, or the American Petroleum Institute Pressure Vessel Inspection Code shall apply.