ALABAMA DEPARTMENT OF LABOR
ADMINISTRATIVE CODE

CHAPTER 480-7-1
GENERAL PROVISIONS

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Ed. Note: Former Chapter 490-X-1 has been renumbered Chapter 480-7-1. Due to the merger of the Department of Industrial Relations and the Department of Labor, the Department of Industrial Relations has been dissolved and all the rules will be listed under the Department of Labor as per certification filed January 9, 2013; effective February 13, 2013.

480-X-1-.01 Definition Of Terms. As used in this chapter, the terms provided herein shall have the following meanings:

(1) Accumulation test - a test by which the capacity of the safety or safety relief valves is checked to ensure that the pressure of the boiler does not rise six percent above the highest setting of any valve and, in no case, six (6) percent above the maximum allowable working pressure under maximum firing conditions.

(2) Act - the provisions of the Boiler and Pressure Vessel Safety Act, codified at Code of Ala. 1975, §§25-12-1 to -22 (2000).

(3) Alabama State Special - a boiler or pressure vessel that is of a special design and cannot be constructed to the Code. This may include hobby boilers or boilers used for educational or historical purposes.

(4) Alteration - a change in any item described on the original manufacturer's data report that affects the pressure 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 or pressure vessel, shall be considered

an alteration. A reduction of minimum temperature such that additional mechanical tests are required shall be considered an alteration.

(5) Approved - approved by the Alabama Board of Boiler and Pressure Vessels, the Commissioner of Labor, or the Commissioner's designee.

(6) Authorized inspection agency - one of the following:

(a) The State of Alabama Department of Labor; or

(b) Any insurance company that has been licensed to write boiler and pressure vessel insurance in the State of Alabama, is insuring boilers and pressure vessels in this State, and provides inspection services as may be required by such insurance company in this State; or

(c) An approved owner/user inspector.

(7) Board - the Alabama Board of Boilers and Pressure Vessels.

(8) Boiler - 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) Electric Boiler - a power boiler or heating boiler in which electricity provides the source of heat.

(b) Heating Boiler - a steam or vapor boiler operating at a pressure not exceeding 15 psig or a boiler in which water or other fluid is heated and intended for operation at pressures not exceeding 160 psig or temperatures not exceeding 250°F.

(c) High Pressure High Temperature Water Boiler - a water boiler operating at pressures exceeding 160 psig or temperatures exceeding 250°F.

(d) Hot Water Heating Boiler - a boiler in which no steam is generated, from which hot water is circulated for heating purposes and then returned to the boiler, and which operates at a pressure not exceeding 160 psig and/or a temperature of 250°F at or near the boiler outlet.

(e) Hot Water Supply Boiler - a boiler or heater completely filled with water that furnishes hot water to be used externally to itself at pressures not exceeding 160 psig or a temperature not exceeding 250°F for hot water supply boilers, or temperatures not exceeding 210°F for hot water supply heaters.

(f) Low Pressure Steam or Vapor Heating Boiler - a steam or vapor boiler operated at pressures not exceeding 15 psig.

(g) Miniature Boiler - a power boiler or high temperature water boiler that does not exceed the following limits:

1. 16 inches inside diameter of shell;

2. 20 square feet heating surface (not applicable to electric boilers);

3. 5 cubic feet gross volume, exclusive of casing and insulation;

4. 100 psig maximum allowable working pressure.

(h) Portable Boiler - a boiler primarily intended for a temporary location whose construction and usage permits it to be readily moved from one location to another.

(i) Power Boiler - a boiler in which steam or other vapor is generated at a pressure of more than 15 psig.

(j) Steam Heating Boiler - a steam boiler for operation at pressures not exceeding 15 psig.

(k) Unfired Steam Boiler - an unfired pressure vessel or system of unfired pressure vessels intended for operation at a pressure in excess of 15 psig steam for the purpose of producing and controlling an output of thermal energy.

(9) Certificate inspection - an inspection, the report of which is used by the chief inspector as justification for issuing, withholding, or revoking the certificate of inspection. This certificate inspection shall be as complete an inspection as possible. Regular certificate inspections are re-inspections or new inspections scheduled by the State.

(a) Internal inspection - as complete an examination as can reasonably be made of the internal and external surfaces of a boiler, pressure vessel, or nuclear component while it is shut down, and in which manhole plates, handhole plates, or other inspection-opening closures are removed as required by the inspector.

(b) External inspection - an inspection made when a boiler, pressure vessel, or nuclear component is in operation, if possible.

(10) Certificate of competency - a certificate issued to a person who has passed the examination prescribed by the Board.

(11) Certificate of inspection - a certificate issued by the chief inspector for the operation of a boiler or pressure vessel, as required by the Act.

(12) Chief inspector - the chief boiler and pressure vessel inspector appointed by this Act.

(13) Code - the required minimum standards for the safe construction, installation, inspection, maintenance, and repair of boilers and pressure vessels as set out in the publications adopted by reference herein: API Code Sections 510, 570; ASME Boiler and Pressure Vessel Code Sections I; III, Divisions I and II; IV; VIII, Divisions I, II, and III; and X; National Board Inspection Code; Controls and Safety Devices for Automatically Fired Boilers (CSD-1); National Fire Protection Association, Inc. Code Sections 31, 54, 58, 70, 85, and 211; ASME Pressure Vessels for Human Occupancy (PVHO-1).

(14) Commission; National Board - 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 inspections in accordance with the National Board bylaws and whose employer submits the inspector's application to the National Board for such commission.

(15) Commissioner - the Commissioner of the Alabama Department of Labor.

(16) Condemned boiler or pressure vessel - a boiler or pressure vessel that has been inspected and declared unsafe or disqualified by legal requirements by an inspector. A stamp or marking has been applied to the boiler or pressure vessel by the chief inspector or the deputy inspector designating its condemnation.

(17) Department - the Alabama Department of Labor.

(18) Existing installation - includes any boiler and/or pressure vessel constructed, installed, placed in operation, or contracted for before January 1, 2002.

(19) Fitting, Appliance, or Appurtenance - such necessary safety and operating devices as are attached to a boiler and/or pressure vessel.

(20) Hobby - an activity pursued outside of one's regular work, primarily for pleasure, for which one receives no monetary gain.

(21) Inspector - the chief inspector, or any deputy inspector, special inspector, or owner/user inspector.

(a) Chief inspector - the chief boiler and pressure vessel inspector appointed under the Act.

(b) Deputy inspector - any inspector appointed by the Commissioner under the provisions of the Act and who is responsible to the chief inspector.

(c) Special inspector - an inspector holding an Alabama certificate of competency who is regularly employed by an insurance company authorized to insure and is insuring against loss from explosions of boilers or pressure vessels in this State.

(d) Owner/User inspector - an inspector continuously employed by a company owning and operating pressure vessels in this State for the purpose of making inspections of pressure vessels used or to be used by such company, but not for resale, providing such company complies with the requirements of Section 25-12-10 of the Boiler and Pressure Vessel Safety Act, Code of Ala. 1975.

(22) Installation - the act of installing boilers and pressure vessels, including all fittings, appliances, and/or appurtenances, as defined herein.

(23) Installation permit - written authorization to perform the installation of boilers and pressure vessels in this State.

(24) Insurance company - an insurance company that has been licensed or registered by the appropriate authority of a state of the United States or a province of Canada to write boiler and pressure vessel insurance in the State of Alabama, is insuring boilers and pressure vessels in this State, and provides inspection services as may be required by such insurance company in this State.

(25) Investigative committee - a subcommittee of the Board established for the purpose of investigating any incidents or complaints referred to the Board for possible violations of the Act and/or any appeals to the Board pursuant to the provisions of this chapter. The committee is comprised of the chief inspector, one Board member appointed by the Commissioner, and the Commissioner or his/her designee.

(26) Jurisdiction - a state, commonwealth, county, or municipality of the United States or a province of Canada that has adopted one or more sections of the ASME Code, one of which is Section I, and that maintains a duly constituted department, bureau, or division for the purpose of enforcement of such Code.

(27) Lap seam crack - a crack found in a lap seam, extending parallel to the longitudinal joint and located either between or adjacent to rivet holes.

(28) Potable Water Heater - a water heater with a corrosion resistant lining or constructed with corrosion resistant material, used to supply potable hot water at a pressure not exceeding 160psig or a temperature not exceeding 210°F when any of the following is exceeded:

(a) a heat input of 200,000 BTUs per hour;

(b) a nominal water containing capacity of 120 gallons.

(29) National Board (NB) - the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229, whose membership is comprised of the chief inspectors of jurisdictions who are charged with the enforcement of the provisions of the Act.

(30) National Board commission - 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.

(31) National Board commissioned inspector - 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, and who holds a National Board commission and is regularly employed as an inspector by an authorized inspection agency.

(32) National Board Inspection Code (NBIC) - the manual for boiler and pressure vessel inspectors published by the National Board and adopted by the Board.

(33) New boiler or pressure vessel installation - all boilers and/or pressure vessels constructed, installed, placed in operation, or contracted for after January 1, 2002.

(34) Nonstandard boiler or pressure vessel - a boiler or pressure vessel that does not bear the ASME stamp and National Board number or that otherwise does not comply with the Act or the stated rules and regulations of the Board.

(35) Owner/User - any person, firm, or corporation legally responsible for the safe installation, operation, and maintenance of any boiler or pressure vessel in this State.

(36) Owner/User inspection agency - an owner or user of pressure vessels who maintains a regularly established inspection department, whose organization and inspection procedures meet the requirements of Code of Ala. 1975, §25-12-10 (2000) and the rules and regulations of this Board and are acceptable to the Board.

(37) Pressure vessel - a vessel other than those vessels defined as boilers in which the pressure is obtained from an external source or from the application of heat.

(38) psig - pounds per square inch gage.

(39) Reinstalled boiler or pressure vessel - a boiler or pressure vessel removed from its original setting and reinstalled at the same or at a new location in the State of Alabama without change of ownership.

(40) Relief valve - a pressure relief valve actuated by inlet static pressure having a gradual lift 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.

(41) Repair - the work necessary to restore a boiler or pressure vessel to a safe and satisfactory operating condition, provided there is no deviation from the original design.

(42) Rerating - a change in the maximum allowable working pressure or temperature of a boiler or pressure vessel, regardless of whether or not physical work is performed on the boiler or pressure vessel. Rerating shall be considered an alteration.

(43) Safety valve - a pressure relief valve actuated by inlet static pressure and characterized by rapid opening or pop action.

(44) Secondhand boiler or pressure vessel - a boiler or pressure vessel that has changed both location and ownership since last used.

(45) Special inspection - any inspection performed by the State other than a regularly scheduled inspection, including instances where the original inspection was rescheduled due to the owner or user's failure to prepare the boiler or pressure vessel after notification.

(46) Standard boiler or pressure vessel - a boiler or pressure vessel that bears the ASME stamp and National Board number; cast iron boilers are not registered with the National Board and are not considered to be standard boilers.

Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman

Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.

History: **New Rule:** Filed February 17, 2004; effective March 26, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

480-7-1-.02 Adoption Of Codes And Standards.

(1) Unless otherwise provided by applicable law or the provisions of this chapter, the required minimum standards for the safe construction, installation, inspection, maintenance, and repair of boilers and pressure vessels in the State of Alabama shall be those prescribed in the following publications. All editions of the codes and standards adopted herein by the Alabama Board of Boilers and Pressure Vessels shall incorporate by reference any future revisions, amendments, interpretations, and editions made, approved, and/or adopted by each code or standard society, unless otherwise stated by the Board.

(a) Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers (ASME), 2001 edition, published by the ASME, 22 Law Drive, Box 2300, Fairfield, New Jersey 07007-2300.

(b) National Board Inspection Code (NBIC), 2002 edition, published by the National Board of Boiler and Pressure Vessel Inspectors (NB), 1055 Crupper Avenue, Columbus, Ohio 43229.

(c) American Petroleum Institute (API) Codes 510 and 570, published by the American Petroleum Institute, 1220 L Street NW, Washington, D.C. 20005.

(d) ASME Code Section I for Boiler Pressure Piping and Piping Systems, as described in B31.1, published by the ASME, 345 East 47th Street, New York, New York 10017.

(e) Controls and Safety Devices for Automatically Fired Boilers (ANSI/ASME CSD-1) for boilers of less than 12.5 million BTU per hour, 2001 edition, published by the ASME, 345 East 47th Street, New York, New York 10017.

(f) National Fire Protection Association (NFPA) Section 85 Standards for boiler controls and safety devices of boilers with more than 12.5 million BTU per hour, published by

the National Fire Protection Association, Inc., Battery-march Park, Quincy, Massachusetts 02269.

(g) ASME Pressure Vessels for Human Occupancy (PVHO-1), 1996 edition, published by the ASME, 345 East 47th Street, New York, New York 10017.

Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman

Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.

History: **New Rule:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

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CHAPTER 480-7-2 ADMINISTRATION

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Ed. Note: Former Chapter 490-X-2 has been renumbered Chapter 480-7-2. Due to the merger of the Department of Industrial Relations and the Department of Labor, the Department of Industrial Relations has been dissolved and all the rules will be listed under the Department of Labor as per certification filed January 9, 2013; effective February 13, 2013.

480-7-2-.01 Examination For Certificate Of Competency.

(1) Applicants for the examination for a certificate of competency shall satisfy the requirements of this section.

(2) An applicant for examination must meet the current qualification criteria for education and experience required under the National Board's Rules for Commissioned Inspectors, as provided on the application form prescribed by the Board.

(3) An application for examination shall be submitted on the form prescribed by Board and shall contain an accurate educational and employment history. Applications shall be submitted to the chief inspector at least 45 days prior to the date of the examination.

(4) The Board may reject any application for examination containing a willfully false or misleading statement or any application from an unqualified applicant who fails to meet the qualification criteria set out in paragraph (2) above.

(5) The examination is prepared and graded by the National Board and

(a) covers the construction, installation, operation, maintenance, and repair of boilers and pressure vessels and their appurtenances;

(b) is given on the first Wednesday and one-half Thursday of March, June, September, and December at a site determined by the Board.

(6) Two members of the Board shall be present at all times during the examination.

(7) Applicants who fail to pass the examination may appeal to the Board to sit for another examination given at least 90 days after the first examination.

(8) The chief inspector shall issue a certificate of competency to all applicants who succeed in passing the written examination and are employed on a full-time basis by an authorized inspection agency, as defined herein.

(9) Requests for certificates of competency may also be processed upon proof that the applicant has a present commission as an inspector of boilers and pressure vessels issued by the National Board or a commission or certificate of competency as an inspector of boilers or pressure vessels from a state that has a standard of examination substantially equal to that of this State.

(10) Certificates of competency are valid through December 31st of each year. Renewal requests shall be submitted to the Board no later than December 1st of each year in order to remain active.

(11) Employing companies shall return certificates of competency to the Board upon the termination of employment of any inspector.

(12) A certificate of competency may be suspended or revoked by the Board upon proof of incompetence, untrustworthiness, or willful falsification of any statement in any application or inspection report.

(13) A certificate of competency as an owner/user inspector shall be issued to an inspector of a company operating pressure vessels in this State only if, in addition to meeting the requirements stated herein, the inspector is employed

full-time by the company and is responsible for making inspections of pressure vessels used or to be used by the company and that are not for resale.
Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman
Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.
History: **New Rule:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

480-7-2-.02 Fees.

(1) Schedule of fees - the owner or user of a boiler or pressure vessel required by this Act to be inspected by the chief inspector or his/her deputy inspector shall pay directly to the chief inspector, upon completion of inspection, fees in accordance with the following schedule:

(a) Power boilers and high temperature water boilers:

1. Boilers of 50 sq. ft. of heating surface or less..... $ 60

2. Boilers over 50 sq. ft. and less than 2000 sq. ft..... $ 90

3. Boilers of 2000 or more sq. ft..... $120

For electric boilers, one kilowatt equals one square foot of heating surface.

(b) Heating boilers

1. With manhole..... $ 90

2. Without manhole..... $ 60

(c) Pressure vessels - fees are based on the maximum length of the vessel times the maximum width or diameter thereof in feet.

1. Each pressure vessel subject to inspection having a product, as determined above, of 50 sq. ft. or less..... $ 60

2. For each additional 100 sq. ft., or portions thereof, of area in excess of 50 sq. ft..... $ 10

(d) Inspection fees will be charged for any trip made by the inspector for the purpose of a certificate inspection, permit inspection, follow-up inspection, insurance cancellation inspection, internal, and/or external inspection.

(2) Installation permit fee

(a) All pressure vessels..... $50

(b) All boilers..... $50

(c) All Alabama State Specials..... $75

(3) Certificate of inspection fees

(a) Power boilers and high pressure, high temperature water boilers..... $50 annually

(b) Low pressure steam or vapor heating boilers..... $50 biennially

(c) Hot water heating and hot water supply boilers..... $50 biennially

(d) Pressure vessels..... $10 annually

(4) The owner, user, agent, or installer is responsible to ensure that the equipment is accessible and prepared for inspection and that the necessary personnel are available to the inspector as required. Failure to meet any of the above requirements will result in cancellation of the inspection and will cause the owner, user, agent, or installer to be charged a fee of $100 per hour, including travel time, for the inspector's time. This fee must be paid before an inspection can be rescheduled or any other inspections can be completed at that location.

(5) Penalties and interest fees

(a) Boilers and pressure vessels subject to operating certificate inspections by special inspectors, or owner or user inspectors, shall be inspected within sixty (60) calendar days following the required re-inspection date. Inspections not performed within this sixty (60) calendar day period shall

result in a fine of five hundred dollars ($500) for each boiler or pressure vessel not inspected.

(b) Inspection fees due on boiler and pressure vessels subject to inspection by the chief or deputy inspectors or operating certificate fees due from inspections performed by special inspectors, or owner or user inspectors, shall be paid within sixty (60) calendar days of completion of the inspections.

(c) Inspection fees or operating certificate fees unpaid within sixty (60) calendar days shall bear interest at the rate of 1.5 percent per month or any fraction of a month. Interest shall continue to accrue until all amounts due, including interest, are received by the commissioner.

(d) The Commissioner may waive the collection of the penalties and interest assessed as provided herein when it is reasonably determined that the delays in inspection or payment were unavoidable or due to the action or inaction of the Department.

(e) Inspection fees or operating certificate fees must be paid in order to validate operating certificates. Fees not paid within sixty (60) calendar days of completion of inspection shall cause the suspension of the operating certificate until such time as all outstanding fees are paid. When an operating certificate is suspended for lack of payment, the deputy inspector shall re-inspect the boilers, hot water heaters, or pressure vessels suspended from operation, and the inspection fee will be charged and collected prior to reinstating the operating certificate.

(6) Special inspection fee, for purposes of any inspection performed by the State other than a regularly scheduled inspection, excluding inspections encompassed under the provisions of paragraph (4) above..... $100

Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman

Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.

History: **New Rule:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

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Ed. Note: Former Chapter 490-X-3 has been renumbered Chapter 480-7-3. Due to the merger of the Department of Industrial Relations and the Department of Labor, the Department of Industrial Relations has been dissolved and all the rules will be listed under the Department of Labor as per certification filed January 9, 2013; effective February 13, 2013.

480-7-3-.01 Installation Of New, Reinstalled, Secondhand, Or Special Design Boilers Or Pressure Vessels.

(1) The company or person responsible for the installation of any boiler or pressure vessel shall obtain an installation permit before any installment work is performed. A "Request to Install a Boiler or Pressure Vessel" must be submitted along with the installation permit fee to the Alabama Department of Labor. The Manufacturers Data Report for ASME Code Stamped and National Board Registered Boilers or Pressure Vessels must also accompany the "Request to Install." For boilers or pressure vessels of special design, the "Request to Install" must be accompanied by drawings, calculations, and any other information the chief inspector may require. No boiler or pressure vessel shall be installed in this State unless the boiler or pressure vessel meets all adopted codes, standards, and/or these rules.

(2) All installation permits that have not had any action taken toward installation shall expire twelve (12) months after the issue date. The expiration date shall be shown on the permit. The fee for an expired permit shall be forfeited and the file closed out. The company or person performing the installation must resubmit all information as required in

paragraph (1) above in order to obtain a subsequent installation permit.

(3) All installations shall meet the requirements of the Code as defined in these rules.

Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman

Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.

History: **New Rule:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

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Ed. Note: Former Chapter 490-X-4 has been renumbered Chapter 480-7-4. Due to the merger of the Department of Industrial Relations and the Department of Labor, the Department of Industrial Relations has been dissolved and all the rules will be listed under the Department of Labor as per certification filed January 9, 2013; effective February 13, 2013.

480-7-4-.01 Assignment And Application Of Serial Numbers.

(1) Alabama serial numbers shall be issued to all deputy inspectors, special inspectors, or owner/user inspectors when requested in writing. No number shall be assigned to a boiler or pressure vessel unless that number has been obtained from the chief inspector. Only one Alabama serial number shall be assigned to a boiler or pressure vessel.

(2) Upon completion of the installation of the boiler or pressure vessel or at the time of the initial certificate inspection of an existing installation, each boiler or pressure vessel shall have the Alabama serial number applied in the following manner:

(a) Each boiler or pressure vessel of steel construction, where direct impression stamping would not be detrimental, shall have the letters "AL"; directly below the "AL" shall be stamped the Alabama serial number, with a five point star stamped immediately adjacent to the first and last digit of the number. All stamping shall be accomplished by low stress steel dies 5/16 in. high.

(b) Potable water heater ASME Code Symbol stamped HLW, cast iron sectional boilers, water tube boilers with cast headers, and other types of boilers or pressure vessels that

will be damaged by direct impression stamping shall be identified with a corrosion resistant metal tag furnished by the Department of Labor containing the information described in (2) (a) above. The tag shall be attached as permanently as practicable to the external jacket or other covering of the boiler or pressure vessel.

(c) The Alabama serial number shall not be concealed by lagging or paint.

(d) No person other than the chief inspector or the deputy inspector shall deface or remove such numbers, except as approved by the chief inspector.

(e) Any boiler or pressure vessel stamped or identified with the corrosion resistant metal tag, having been inspected and declared unsafe by the chief inspector or deputy inspector, without the possibility of repair, shall be stamped with an "X" on the star on either side of the Alabama serial number, designating a condemned boiler or pressure vessel.
Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman
Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.
History: **New Rule:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

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Ed. Note: Former Chapter 490-X-5 has been renumbered Chapter 480-7-5. Due to the merger of the Department of Industrial Relations and the Department of Labor, the Department of Industrial Relations has been dissolved and all the rules will be listed under the Department of Labor as per certification filed January 9, 2013; effective February 13, 2013.

480-7-5-.01 Boiler And Pressure Vessel Inspection Requirements.

(1) On or after January 1, 2002, each boiler and pressure vessel used or proposed to be used within this State, except for boiler and pressure vessels exempted by the Act, shall be thoroughly inspected as to its construction, installation, and condition as follows:

(a) Power boilers and high pressure, high temperature water boilers shall receive a certificate inspection annually, which shall be an internal inspection where construction permits; otherwise, it shall be as complete an inspection as possible. The boilers shall also be externally inspected while under pressure, if possible.

(b) Low pressure steam or vapor heating boilers shall receive a certificate inspection biennially with an internal inspection every four years where construction permits.

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

(d) Pressure vessels subject to internal corrosion shall receive a certificate inspection every three years with an internal inspection at the discretion of the inspector. Pressure vessels not subject to internal corrosion shall receive a certificate inspection every 24 months.

(2) The Commissioner, chief inspector, or any deputy inspector shall have free access during reasonable hours to any premises in the State where boilers or pressure vessels are being constructed, installed, operated, maintained, or repaired for the purpose of performing any required safety inspections in accordance with the Act and these rules. Any owner/user or person responsible for boilers or pressure vessels that denies access for inspection shall be in violation of the Act.
Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman
Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.
History: **New Rule:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed March 15, 2006; effective April 19, 2006. **Amended:** Filed January 9, 2013; effective February 13, 2013.

480-7-5-.02 Cessation Orders On Unsafe Equipment Or Equipment Operating In Violation Of These Rules.

(1) The Commissioner or his authorized representative may issue a written order for the temporary cessation of operation of a boiler or pressure vessel if it has been determined after inspection to be hazardous or unsafe. Operation shall not resume until such conditions are corrected to the satisfaction of the Commissioner or his representative.

(2) Any boiler or pressure vessel that cannot be made safe for continued operation shall be condemned.

(3) Any person aggrieved by an order or act of the Commissioner or the chief inspector may appeal to the Board in accordance with Section 20 of the Act.
Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman
Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.
History: **New Rule:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

480-7-5-.03 Notification Of Inspection.

(1) The owner/user, company or person performing the installation is responsible for notifying the inspector when the boiler or pressure vessel is ready for inspection. For insured boilers and pressure vessels, notification will be made to the special inspector employed by the company insuring the boiler or pressure vessel. For uninsured boilers and pressure vessels, notification will be made to the Department of Labor.

(2) All insurance companies shall notify the chief inspector of all boilers or pressure vessels on which insurance is initially written, cancelled, not renewed, or suspended within 30 days of such issuance, cancellation, non-renewal, or suspension.

(3) Special inspectors are required to notify the chief inspector of unsafe boilers and pressure vessels.

(a) If an inspector, upon first inspection, finds that a boiler or pressure vessel, or any appurtenance thereof, is in such condition that he would refuse to issue an inspection certificate, the inspector shall immediately notify the chief inspector and submit a report of the defects observed.

(b) If, upon inspection, an inspector finds a boiler or pressure vessel to be unsafe for further operation, he shall promptly notify the owner or user, stating what repairs or other corrective measures are needed. The inspector shall also immediately notify his supervisor or the chief inspector of the unsafe condition. Until such corrections have been made, no further operation of the boiler or pressure vessel involved shall be permitted. If an inspection certificate for the object is required and is in force, it shall be suspended by the chief inspector. When re-inspection establishes that the necessary

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

(c) Each owner/user inspection agency shall, as required by the provisions of the Act and these rules and regulations:

1. conduct inspections of pressure vessels utilizing only qualified inspection personnel, as provided in this chapter.

2. retain a true copy of each of the latest inspection reports signed by the inspector on file at the location where the equipment is inspected.

3. execute and deliver a true report of each inspection to the chief inspector together with appropriate requirements or recommendations that result from such inspections.

4. maintain inspection records, which will include a list of each pressure vessel covered by the Act, showing a serial number and such abbreviated descriptions as may be necessary for identification, the date of last inspection of each unit, and the approximate date for the next inspection. Such inspection records shall be readily available for examination by the chief inspector or his authorized representative during regular business hours.

(d) Boilers and pressure vessels overdue for inspection by more than 6 months shall be inspected by a deputy inspector. The owner/user may be invoiced for a special inspection as specified in Rule 165-X-2-.02.

Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman

Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.

History: **New Rule:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

480-7-5-.04 Notification Of Incident.

(1) When an incident occurs to a boiler or pressure vessel, the owner or user shall promptly notify the chief inspector by submitting a detailed report of the incident. In the event of a personal injury or any explosion, notice shall be given immediately by telephone, telegraph, or messenger, and neither the boiler nor pressure vessel, nor any part thereof, shall be removed or disturbed before permission to do so has been given by the chief inspector, except for the purpose of saving human life and limiting consequential damage.

(2) If an inspection is made as a result of an incident, the inspector will inform the owner or user of the requirements set forth in paragraph (1).

Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman

Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.

History: **New Rule:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

480-7-5-.05 Validity Of Certificate Of Inspection.

(1) A certificate of inspection shall be valid until expiration unless some defect or condition affecting the safety of the boiler or pressure vessel is disclosed, provided, however, that a certificate of inspection issued for a boiler or pressure vessel inspected by a special inspector shall be valid only if the boiler or pressure vessel for which it was insured continues to be insured by a duly authorized insurance company.

(2) The Commissioner or his authorized representative may extend the expiration date of any certificate of inspection. Requests for extension must be submitted in writing to the Department stating the reason for the extension. The Commissioner or his authorized representative shall respond, in writing, to any requests for extensions.

Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman

Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.

History: **Amended:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

480-7-5-.06 Repair And Alterations To Boilers And Pressure Vessels.

(1) Repairs and alterations to boilers and pressure vessels shall be made in accordance with the latest edition and addenda of the National Board Inspection Code (NBIC) or the API Pressure Vessel Inspection Code, as applicable.

(2) Repairs and alterations performed in accordance with the NBIC must be made by a valid National Board "R" certificate holder whose certificate of authorization encompasses the type and scope of work to be performed.

(3) Repairs and alterations must be acceptable to the inspector responsible for the in-service inspection of the boiler or pressure vessel.

(4) Repairs and alterations must be documented and submitted to the chief inspector as required by the NBIC or the API Pressure Vessel Inspection Code.

Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman

Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.

History: New Rule: Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

480-7-5-.07 Preparation For Certificate Inspection.

(1) The owner or user shall prepare each boiler or pressure vessel for inspection and shall prepare for and apply a hydrostatic or pressure test, whenever necessary, on the date arranged by the inspector.

(2) The owner or user shall prepare a boiler for internal inspection in the following manner:

(a) The fuel supply and ignition system shall be locked out and/or tagged out in accordance with the owner/user's procedures.

(b) Water shall be drained off and the boiler washed thoroughly;

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

(d) All grates of internally fired boilers shall be removed;

(e) 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;

(f) The pressure gage shall be removed for testing, as required by the inspector;

(g) 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 by any appropriate means approved by the inspector; and

(h) Before opening the manhole or handhole covers and entering any parts of the steam generating unit connected to a common header with other boilers, the non-return and steam stop valves shall be closed, tagged, and padlocked, and drain valves or cocks between the two valves opened. The feed valves shall be closed, tagged, and padlocked. Blowoff lines, where practicable, shall be disconnected between pressure parts and valves. All drains and vent lines shall be opened.

(3) Pressure vessels shall be prepared for inspection to the extent deemed necessary by the inspector as outlined herein.

(4) If a boiler or pressure vessel has not been properly prepared for an internal inspection, or if the owner or user failed to comply with the requirements for a pressure test as set forth in these rules, the inspector may decline to make the inspection or test, and the inspection certificate shall be withheld or suspended until the owner or user complies with the requirements.

(5) If the boiler or pressure vessel is jacketed so that the longitudinal seams of shells, drums, or domes cannot be seen, sufficient jacketing, setting wall, or other form of casing or housing shall be removed to permit reasonable inspection of the seams and other areas necessary to determine

the condition and safety of the boiler or pressure vessel, provided such information cannot be determined by other means.

(6) The shell or drum of a boiler or pressure vessel in which a lap seam crack is discovered along a longitudinal riveted joint shall be immediately discontinued from use. Patching shall be prohibited.

(7) Pressure Tests

(a) A hydrostatic pressure test, when applied to boilers, shall not exceed 1-1/2 times the maximum allowable working pressure. The pressure shall be under proper control so that in no case shall the required test pressure be exceeded by more than six (6) percent.

(b) A hydrostatic pressure test, when applied to pressure vessels, shall not exceed 1-1/2 times the maximum allowable working pressure, except as permitted by the applicable ASME Code.

(c) During a hydrostatic test, the safety valve or valves shall be removed or gagged; if gagged, 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 also be used.

(d) The minimum temperature of the water used to apply a hydrostatic test shall be not less than 70°F, and the maximum metal temperature during inspection shall not exceed 120°F.

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

(f) When the contents of the vessel prohibit contamination by any other medium or when a hydrostatic test is not possible, other testing media may be used, providing the precautionary requirements or the applicable sections of the ASME Code are followed.

(8) No employer (owner or user) shall permit entry to, nor shall an employee or inspector enter, a boiler furnace, drum, or header or pressure vessel until all requirements of the Occupational Safety and Health Administration, Department of

Labor, 29 CFR 1910.146 Permit-Required Confined Space Standard, have been met and until the inspector or supervisor and the person entering the boiler or pressure vessel have confirmed that all stop valves on inlet and outlet piping not vented to the atmosphere have been closed and tagged. Where not valved, the piping shall be disconnected or blanked. In addition, plant personnel shall make appropriate tests to ensure that there are no oxygen deficiencies or hazardous or toxic gases in the boiler furnace, drum, or header or pressure vessel to be entered by the inspector. Prior to and during entry, an approved person must be outside the boiler or pressure vessel to ensure compliance with all confined space procedures.

Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman

Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.

History: New Rule: Filed February 20, 2004; effective March 23, 2004.

480-7-5-.08 Existing Installations.

(1) Power Boilers

(a) 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 thirty (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 thirty (30) minutes during which no distress or leakage develops, may be continued in operation at the working pressure determined by Rule 165-X-4-.08(1)(c). The age limit of any nonstandard boiler having lap-riveted longitudinal joints and operating at a pressure in excess of 50 psig shall be twenty (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 Rule 165-X-4-.08(1)(b).

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) 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) 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.

2. 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 8.0. When this latter type of boiler is removed from its existing setting, it shall not be reinstalled for pressures in excess of 15 psig.

3. 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.

4. 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:

(i) (TS)(t)(E)

$$\frac{\text{----------}}{(R)(FS)} = \text{maximum allowable working pressure, psig}$$

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

5. The inspector may increase the factor of safety if the condition and safety of the boiler warrant an increase.

(d) 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 has 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 inspector.

4. No valves of any description shall be placed between the safety valve and the boiler nor 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 so located or piped so that they are carried 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 six (6) percent above the highest pressure to which any valve is set, and in no case to more than six (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 three (3) percent above the maximum allowable working pressure, but the range of setting of all the safety valves on a boiler shall not exceed ten (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 six (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 that can flow into the lower pressure system.

8. In those cases where the boiler is supplied with feedwater directly from water mains without the use of feeding apparatus (not to include return traps), no safety valve shall be set at a pressure greater than ninety-four (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:

(i) 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 six (6) percent of the maximum allowable working pressure. This method should not be used on a boiler with a superheater or reheater;

(ii) 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 I;

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

(iv) If there is any doubt as to the capacity of the safety relief valve, the inspector may require an accumulation test.

10. When either of the methods outlined in 9.(i) or (ii) 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.

(e) Boiler Feeding

1. Each boiler shall have a feed supply that will permit it to be fed at any time while under pressure.

2. 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 three (3) percent greater than the set pressure of the safety valve with the highest setting may be considered one of the means. Boilers fired by gaseous, liquid, or solid fuel in suspension may be equipped with a single means of feeding water, provided means are furnished for the shutoff of heat input prior to the water level reaching the lowest safe level.

3. The feedwater 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

feedwater 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.

4. 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.

5. 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.

6. Where deaerating heaters are not employed, it is recommended that the temperature of the feedwater be not less than 120°F to avoid the possibility of setting up localized stress.

7. Where deaerating heaters are employed, it is recommended that the minimum feedwater temperature be not less than 215°F so that dissolved gases may be thoroughly released.

(f) 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 gage glass. Boilers operated at pressures over 400 psig shall be provided with two water gage 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 gage 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 gage glass may be shut off, but shall be maintained in serviceable condition.

3. When the direct reading of the gage 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 gage glass image or by remote level indicators.

4. The lowest visible part of the water gage 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 gage glass, the same minimum level reference shall be clearly marked.

5. Connections from the boiler to the remote level indicator shall be at east 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 firetube type shall be set so that when the water is at the lowest reading in the water gage 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, two gage cocks for boilers 36 in. in diameter and under, and three gage cocks for boilers over 36 in. in diameter.

8. The lowest gage 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 gage glass shall be not less than 1/2 in. pipe size. Each water gage 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 gage 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. Straight-run globe valves shall not be used on such connections. Automatic shutoff valves, if permitted, shall conform to the requirements of Section I of the ASME Code.

(g) 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 gage cocks may be connected directly to the boiler.

3. The steam and water connections to a water column or a water gage 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 that 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 gage 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 indicate by the position of the operating mechanisms whether they are in open or closed position. 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 feedwater regulators), drains, steam gages, or apparatus of such form as do not permit the escape of an appreciable amount of steam or water therefrom, shall be placed on the pipes connecting a water column or gage glass to a boiler.

(h) Gage Glass Connections

1. Gage glasses and gage cocks that are not connected directly to a shell or drum of the boiler shall be connected by one of the following methods:

(i) The water gage glass or glasses and gage cocks shall be connected to an intervening water column.

(ii) When only water gage glasses are used, they may be mounted away from the shell or drum and the water column omitted, provided the following requirements are met:

(I) The top and bottom gage glass fittings are aligned, supported, and secured so as to maintain the alignment of the gage glass; and

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

(III) 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 gage glass in the boiler shall not be below the highest visible water level in the water gage 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 gage glass and the boiler shall not be above the lowest visible water level in the gage glass. No part of this pipe connection shall be above the point of connection at the water column.

(i) Pressure Gages

1. Each boiler shall have a pressure gage so located that it is easily readable. The pressure gage shall be installed so that it shall at all times indicate the pressure in the boiler. Each steam boiler shall have the pressure gage connected to the steam space or to the water column or its steam connection. A valve or cock shall be placed in the gage connection adjacent to the gage. An additional valve or cock may be located near the boiler, provided it is locked or sealed in the open position. No other shutoff valves shall be located between the gage 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 gage or connection shall contain a siphon or equivalent device that will develop and maintain a water seal that will prevent steam from entering the gage tube.

Pressure gage 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 gage 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.

2. Each forced-flow steam generator with no fixed steam and waterline shall be equipped with pressure gages or other pressure-measuring devices located as follows:

(i) At the boiler or superheater outlet (following the last section which involves absorption of heat), and

(ii) At the boiler or economizer inlet (preceding any section which involves absorption of heat), and

(iii) Upstream of any shutoff valve that may be used between any two sections of the heat-absorbing surface.

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

(j) 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 preferably consist of one automatic non-return valve (set next to the boiler) and a second valve of the outside-screw-and-yoke type.

(k) Blowoff Piping

1. A blowoff 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, gage glasses or piping to feedwater regulators, etc., used for the purpose of determining the operating conditions of such equipment. Piping connections used primarily for continuous operation, such as deconcentrators on continuous blowdown systems, are not classed as blowoffs, 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 blowoff 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 blowoff 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 that do not drain back into the boiler and all integral economizers shall be equipped with outlet connections for a blowoff 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 blowoff may be connected to them. In such cases, the blowoff shall be so located that the connection may be completely drained.

7. A bottom blowoff pipe, when exposed to direct furnace heat, shall be protected by firebrick or other heat-resisting material that is so arranged that the pipe may be inspected.

8. An opening in the boiler setting for a blowoff pipe shall be arranged to provide free expansion and contraction.

(l) 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.

(2) Heating Boilers

(a) 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) Nonstandard Riveted Boilers - The maximum allowable working pressure on the shell of a nonstandard riveted heating boiler shall be determined in accordance with Rule 165-X-4-.08(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) 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) 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) Potable Water Heaters - A potable water heater shall not be installed or used at pressures exceeding 160 psig or water temperatures exceeding 210°F. Water heaters may not be used to simultaneously provide potable hot water and space heat in combination.

(f) Safety Valves

1. Each steam boiler shall have one or more ASME/NB-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. A body drain connection below seat level shall be provided by the manufacturer, 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 I. 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 Rule 165-X-4-.08(2)(f)5. shall be met.

TABLE I
MINIMUM POUNDS OF STEAM PER HOUR PER SQUARE FOOT OF HEATING SURFACE

	Firetube Boilers	Watertube Boilers
Boiler Heating Surface:		
Hand-fired	5	6
Stoker-fired	7	8
Oil, gas, or pulverized fuel-fired	8	10
Waterwall Heating Surface:		
Hand-fired	8	8
Stoker-fired	10	12
Oil, gas, or pulverized fuel-fired	14	16

(i) When a boiler is fired only by a gas giving a heat value not 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-fired boilers above.

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

(iii) 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 Rule 165-X-4-.08(2)(f)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, nor 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 so as to not endanger persons working in the area.

(g) 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/NB-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/NB-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/NB-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/NB-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 five (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 I. 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 Rule 165-X-4-.08(2)(g)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 Rule 165-X-4-.08(2)(g)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 ten (10) percent above the maximum allowable working pressure. When more than one safety relief valve is used, the over-pressure shall be limited to ten (10) percent above the set pressure of the highest set valve allowed by Rule 165-X-4-.08(2)(f)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, nor 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 or the 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 so as to not endanger persons working in the area.

(h) Steam Gages

1. Each steam boiler shall have a steam gage or a compound steam gage connected to its steam space or to its water column or steam connection. The gage or connection shall contain a siphon or equivalent device that will develop and maintain a water seal that will prevent steam from entering the gage tube. The connection shall be so arranged that the gage cannot be shut off from the boiler except by a cock placed in the pipe at the gage 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 gage 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) Pressure or Altitude Gages and Thermometers

1. Each hot water boiler shall have a pressure or altitude gage 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 gage. 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 gage shall be graduated approximately to not less than 1-1/2 nor more than three (3) times the pressure at which the safety relief valve is set.

3. Piping or tubing for pressure or altitude-gage 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) Water Gage Glasses

1. Each steam boiler shall have one or more water gage 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. Gage 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 gage 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 gage 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 gage 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) 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, they shall be properly designated by fastening them with tags of metal or other durable material.

(l) Feedwater Connections

1. Feedwater, 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 valves, safety relief valves, blowoffs, water columns, water gage glass, pressure gages, or temperature gages.

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) 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, feedwater regulator, steam gages, or apparatus which do not permit the escape of any steam or water, except for manually operated blowdowns, 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 feedwater into a boiler). If the water column, gage 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 drain pipe and valve shall be not less than 3/4 in. pipe size.

2. The steam connections to the water column of a horizontal firetube 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 center line 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 gage glass.

(n) 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 gage glass.

(o) 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.

(3) Pressure Vessels

(a) Maximum Allowable Working Pressure for Standard Pressure Vessels - The maximum allowable working pressure for standard pressure vessels shall be determined in accordance with the applicable provisions of the edition of the ASME Code or the API-ASME Code under which they were constructed and stamped.

(b) Maximum Allowable Working Pressure for Nonstandard Pressure Vessels, Except as Provided in Rule 165-X-4-.08(3)(c).

1. The maximum allowable working pressure of a nonstandard pressure vessel 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 set by these rules.

(i)
$$\frac{(TS)(t)(E)}{(R)(FS)} = \text{maximum allowable working pressure, psig}$$

where:

TS = specified minimum tensile strength of shell plate material, psi (When the tensile strength of carbon steel plate is not known, it may be taken as 55,000 psi for temperatures not exceeding 650°F. For other materials, use the lowest stress values for that material from Section VIII of the ASME Code.)

t = minimum thickness of shell plate of weakest course, inches

E= efficiency of longitudinal joint, depending upon construction

Use the following values: for riveted joints - calculated riveted efficiency; for fusion-welded and brazed joints:

	Percent
Single lap weld	40
Double lap weld	50
Single butt weld	60
Double butt weld	70
Forge weld	70
Brazed steel	80

R = inside radius of weakest course of shell in inches, provided the thickness does not exceed ten (10) percent of the radius. If the thickness is over ten (10) percent of the radius, the outer radius shall be used.

FS = factor of safety allowed by these rules

2. The minimum factor of safety shall in no case be less than 5.0 for existing installations. The working pressure shall be decreased when deemed necessary by the inspector to ensure the operation of the vessel within safe limits. The condition of the vessel and the particular service to which it is subject will be the determining factors.

3. The maximum allowable working pressure permitted for formed heads under pressure shall be determined by using the appropriate formulas from ASME Code Section VIII, Division 1, and the tensile strength and factors of safety given in Rules 165-X-4-.08(3)(a), (b)1., and (b)2.

4. The maximum allowable working pressure for nonstandard pressure vessels subjected to external pressure shall be determined by the rules of Section VIII, Division 1, of the ASME Code.

(c) Formulas - Pressure vessels that are not ASME Code-stamped but are constructed of known materials and designed and constructed in accordance with sound engineering standards, formulas, and practices that provide safety equivalent to the intent of the Code shall be calculated on the same basis as used in the original design.

(d) Inspection of Inaccessible Parts - Where, in the opinion of the inspector, as the result of conditions disclosed at the time of inspection, it may be necessary to remove interior or exterior lining, covering, or brickwork to expose certain parts of the vessel not normally visible, the owner or user shall remove such material to permit proper inspection and to determine remaining thickness.

(e) Overpressure Protection - Each pressure vessel shall be provided with pressure relief devices that are ASME/NB-stamped and certified or with indicating and controlling devices as necessary to protect against overpressure. These devices shall be so constructed, located, and installed that they cannot readily be rendered inoperative. The relieving capacity of such pressure relief devices shall be adequate to prevent a rise in pressure in the vessel of more than ten (10) percent or 3 psig, whichever is greater, above the maximum allowable working pressure, except when multiple relieving devices are provided, they shall prevent the pressure from rising more than sixteen (16) percent or 4 psig, whichever is greater, above the maximum allowable working pressure. When multiple pressure relieving devices are provided, at least one device shall be set at or below the maximum allowable working pressure, and the additional devices shall be set no higher than 105 percent of the maximum allowable working pressure. Where an additional hazard is involved due to fire or other unexpected sources of external heat, the pressure relief devices shall meet the requirements of ASME Code Section VIII, Division 1, Paragraph UG-125, or Division 2, Paragraph AR-130, whichever is applicable.

(f) Repairs and Renewals of Fittings and Appliances - Whenever repairs are made to fittings and appliances or it becomes necessary to replace them, the work must comply with the requirements for new installations.

(g) Bulk Storage Liquid Carbon Dioxide Storage Vessels (LCDSVs)

SYSTEM DESCRIPTION

The Liquid Carbon Dioxide Beverage systems include the Liquid Carbon Dioxide Storage Vessel or LCDSV (tank) and associated sub-system circuits - Liquid CO_2 fill circuit, and associated sub-system circuits and Pressure relief / vent line circuit. The LCDSV's are vacuum insulated pressure vessels, constructed of stainless steel, with Super Insulation wrapping between the inner pressure vessel and the outer vacuum jacket.

These Pressure vessels are typically designed for a Maximum Allowable Working Pressure (MAWP) of either 300 psig (2068 kPa) or 283 psig (1951 kPa). The LCDSV come equipped with an ASME/NB certified "UV" Primary Relief Valve (PRV) set at or below the MAWP of the vessel. Additionally, as recommended by the Compressed Gas Association pamphlet CGA S-1.3, (PRESSURE RELIEF DEVICE STANDARDS PART 3 - STATIONARY STORAGE CONTAINERS FOR COMPRESSED GASSES) a secondary relief valve may be installed. This secondary relief valve is beyond the scope of ASME Section VIII, Division 1 and is not required to be ASME/NB stamped and certified. This additional PRV is typically rated no higher than 1.5 times the vessel MAWP.

Operating conditions of the system, components, and inner pressure vessel can vary causing temperatures and pressures to range from 90 psig (-56°F) to and 300 psig (+2°F) {620 kPa (-49°C) to 2068 kPa (-16°C)}. Below about 60 psig (413 kPa) in the tank, liquid CO_2 begins changing to solid phase (dry ice). If the tank becomes completely depressurized to 0 psig, temperatures inside the tank could reach -109°F (-78°C), (solid dry ice). When liquid CO_2 turns to solid dry ice in a completely depressurized tank, all CO_2 gas flow in the system ceases and the tank becomes nonfunctional.

Components external to the LCDSV inner tank pressure vessel may encounter pressures and temperatures between 90 psig, and -56°F to 300 psig and +2°F, respectively {between 620 kPa, and -49°C to 2068 kPa and -16°C, respectively}. Typical operating pressures and temperatures vary in each of the associated sub-system circuits.

INSPECTION REQUIREMENTS OF LCDSVs

SCOPE

This Rule provides requirements for the inspection of LCDSVs, fill boxes, fill lines and pressure relief discharge/vent circuits that are used for carbonated beverage systems, swimming pool PH control systems and other fill in place systems storing 1,000lbs (454 kg) or less of liquid CO_2. Owners/Users are responsible for all fill boxes, fill lines and pressure relief discharge/vent circuits that are not visible at the time of inspection. Inspectors may require owners/Users to verify all piping circuits are installed correctly and functioning properly if necessary.

GENERAL REQUIREMENTS STORAGE TANK LOCATION

LCDSVs should be installed in an unenclosed area whenever possible. LCDSVs that do not meet all criteria for an unenclosed area shall be considered an enclosed area installation. An unenclosed area:

A. Shall be outdoors

B. Shall be above grade

C. Shall not obstruct more than three sides of the perimeter with supports and walls. At least 25% of the perimeter area as calculated from the maximum height of the storage container shall be open to atmosphere and openings shall be in direct conveyance with ground level.

GENERAL REQUIREMENTS (ENCLOSED AND UNENCLOSED AREAS)

A. LCDSVs shall not be located within 10 feet (3050 mm) of elevators, unprotected platform ledges or other areas where falling would result in dropping distances exceeding half the container height.

B. LCDSVs shall have sufficient clearance for filling, operation, maintenance, inspection and replacement.

C. Orientation of nozzles and attachments shall be such that sufficient clearance between the nozzles, attachments, and the surrounding structures is maintained during the installation, the attachment of associated piping, and operation.

D. LCDSVs shall not be located on roofs.

E. LCDSVs shall be safely supported. Vessel supports, foundations and settings shall be in accordance with jurisdictional

requirements, manufacturer recommendations and/or other industry standards as applicable.

F. LCDSVs shall not be located within 36 inches of electrical panels.

G. LCDSVs located outdoors in areas in the vicinity of vehicular traffic shall be guarded to prevent accidental impact by vehicles. The guards or bollards shall be installed in accordance with local building codes or to a national recognized standard when no local building code exists.

H. LCDSVs shall be equipped with isolation valves in accordance with paragraph NBIC Part 1.

LCDSVs LOCATED IN UNENCLOSED AREA(s)

If LCDSVs are installed outdoors and exposed to the elements, appropriate additional protection may be provided as determined by the department based on the general weather conditions and temperatures that the tank may be exposed to. Some possible issues include:

A. Exposure to high solar heating loads will increase the net evaporation rate and will decrease hold times in low CO_2 usage applications. The vessel may be covered or shade provided to help reduce the solar load and increase the time needed to reach the relief valve setting in low use applications.

B. If supply line is not UV resistant then the supply line should be protected via conduit or appropriate covering.

LCDSVs LOCATED IN ENCLOSED AREAS

a. LCDSVs utilizing remote fill connections:

1. Shall be equipped with a gas detection system installed in accordance with NBIC Part 1.

2. Shall have signage posted in accordance with NBIC Part 1.

3. Shall be equipped with fill boxes; fill lines and safety relief/vent valve circuits installed in accordance with NBIC Part 1.

b. **Portable LCDSVs with no permanent remote fill connection: Warning: LCDSVs shall not be filled indoors or in enclosed areas under any circumstances. Tanks must always be moved to the outside to an unenclosed, free airflow area for filling.**

1. Shall be equipped with a gas detection system installed in accordance with NBIC.

2. Shall have signage posted in accordance with NBIC.

3. Shall have a safety relief/vent valve circuit connected at all times except when the tank is being removed for filling. Connects may be fitted with quick disconnect fittings meeting the requirements of NBIC.

4. Shall be provided with a pathway that provides a smooth rolling surface to the outdoor, unenclosed fill area. There shall not be any stairs or other than minimal inclines in the pathway.

FILLBOX LOCATION / SAFETY RELIEF/VENT VALVE CIRCUIT TERMINATION

Fill boxes and/or vent valve terminations shall be installed above grade, outdoors in an unenclosed, free airflow area. The fill connection shall be located so not to impede means of egress or the operation of sidewalk cellar entrance doors, including during the delivery process and shall be:

1. At least three (3) feet (915 mm) from any door or operable windows; The fill box may remain at its current location, if in the opinion of the department, an acceptable gas detection system is installed just inside the doorway and in accordance with NBIC.

2. At least three (3) feet (915 mm) above grade;

3. Shall not be located within ten (10) feet (3050 mm) from side to side at the same level or below, from any air intakes;

4. Shall not be located within ten (10) feet (3050 mm) from stair wells that go below grade.

GAS DETECTION SYSTEMS

Rooms or areas where carbon dioxide storage vessel(s) are located indoors or in enclosed or below grade outdoor locations shall be provided with a gas detection and alarm system for

general area monitoring that is capable of detecting and notifying building occupants of a CO_2 gas release.

Alarms will be designed to activate a low level pre-alarm at 5,000 parts per million (ppm) concentration of CO_2 and a full high alarm at 30,000 ppm concentration of CO_2 which is the NIOSH & ACGIH 15 minute Short Term Exposure Limit for CO_2.

These systems are not designed for employee personal exposure monitoring. Gas detection systems shall be installed and tested in accordance with manufactures installation instructions and the following requirements:

a. Activation of the gas detection system shall activate an audible alarm within the room or area in which the carbon dioxide storage vessel is located.

b. Audible alarms shall also be placed at the entrance(s) to the room or area where the carbon dioxide storage vessel and/ or fill box is located to notify anyone who might try to enter the area of a potential problem.

SIGNAGE

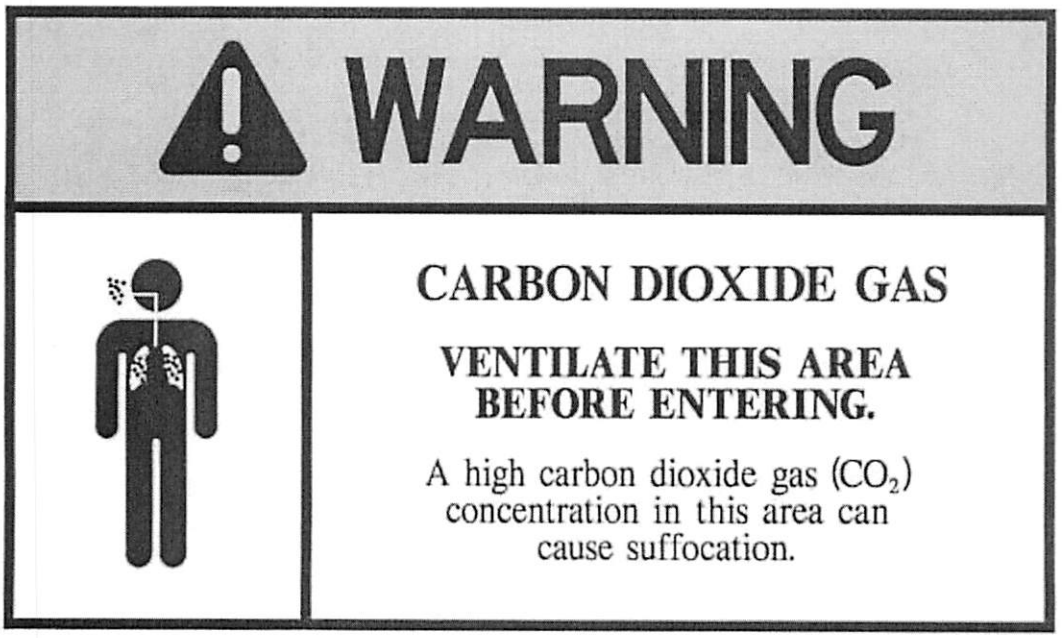
Warning signs shall be posted at the entrance to the building, room, enclosure, or enclosed area where the container is located as indicated below.

The warning sign shall be at least 8 in (200mm) wide and 6 in. (150mm) high.

The wording shall be concise and easy to read and the upper portion of the sign must be orange as shown in figure NBIC Part

1. The size of the lettering must be as large as possible for the intended viewing distance and can be determined by departmental requirements.

The minimum letter height shall be in accordance with NEMA American National Standard for Environmental and Facility Safety Signs (ANSI Z535.2). The warning signs shall state the following:

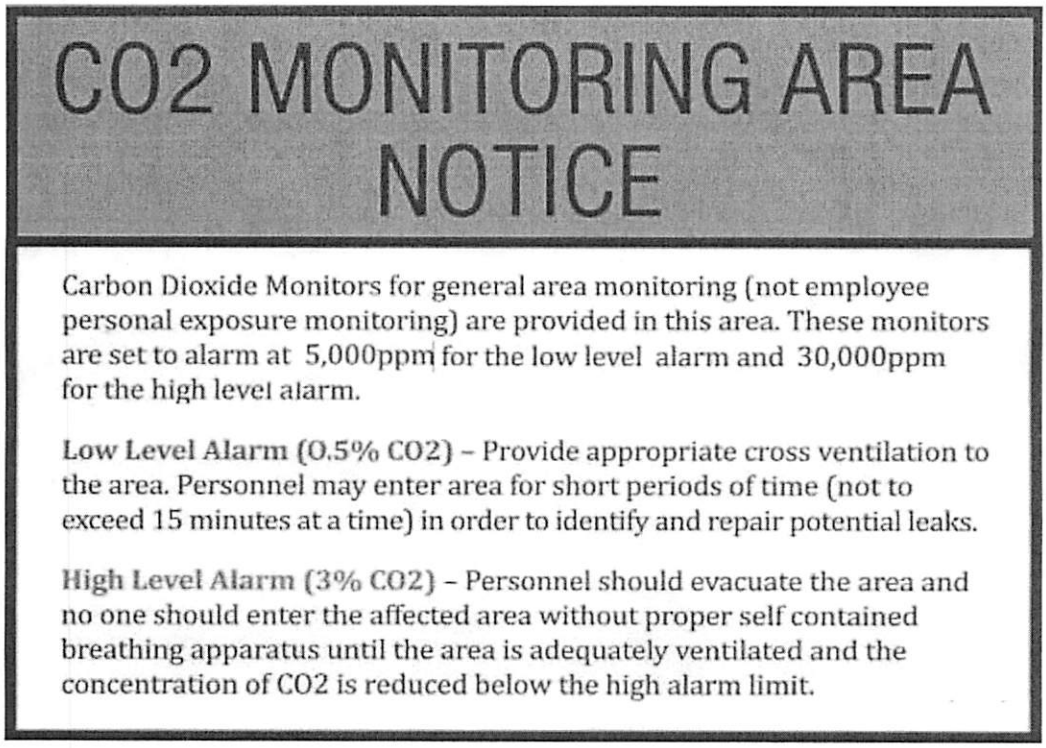


Additional instructional signage shall be posted outside of the area where the container is located and such signage shall contain at minimum the following information:

A. Carbon Dioxide Monitors for general area monitoring (not employee personal exposure monitoring) are provided in this area. These monitors are set to alarm at 5,000 ppm for the low level alarm and at 30,000 ppm for high level alarm.

B. Low Level Alarm 5,000ppm - Provide appropriate cross ventilation to the area. Personnel may enter area for short periods of time (not to exceed 15 minutes at a time) in order to identify and repair potential leaks.

C. High Level Alarm 30,000ppm - Personnel should evacuate the area and nobody should enter the affected area without proper self-contained breathing apparatus until the area is adequately ventilated and the concentration of CO_2 is reduced below the high alarm limit.



VALVES, PIPING, TUBING AND FITTINGS

A. **Materials** - Materials selected for valves, piping, tubing, hoses and fittings used in the LCDSV system shall meet following requirements:

1. Components must be compatible for use with CO_2 in the phase, (gas, or liquid in the applicable circuit) it encounters in the system.

2. Components shall be rated for the operational temperatures and pressures encountered in the applicable circuit of the system.

3. Shall be stainless steel, copper, brass, or plastic/polymer materials rated for CO_2.

4. Only fittings and connections recommended by the manufacturer shall be used for all hoses, tubes, and piping.

5. All valves and fittings used on the LCDSV shall be rated for the maximum allowable working pressure stamped on the tank.

6. All piping, hoses and tubing used in the LCDSV system shall be rated for the working pressure of the applicable circuit in the system and have a burst pressure rating of at least four times the maximum allowable working pressure of the piping, hose or tubing.

B. **Relief Valves** - Each LCDSV shall have at least one ASME/NB stamped & certified relief valve with a pressure setting at or below the MAWP of the tank. The relief valve shall be suitable for the temperatures and flows experienced during relief valve operation. The minimum relief valve capacity shall be designated by the manufacturer. Additional relief valves that do not require ASME stamps may be added per Compressed Gas Association pamphlet, CGAS-1.3 Pressure Relief Device Standards Part 3, Stationary Storage Containers for Compressed Gases, recommendations. Discharge lines from the relief valves shall be sized in accordance with tables NBIC Part 1.

Note: Due to the design of the LCDSV the discharge line may be smaller in diameter than the relief valve outlet size.

Caution: Company's and or individuals filling or refilling LCDSV's shall be responsible for utilizing fill equipment that is acceptable to the manufacturer to prevent over pressurization of the vessel.

C. **Isolation Valves** - Each LCDSV shall have an isolation valve installed on the fill line and tank discharge, or gas supply line in accordance with the following requirements:

1. Isolation valves shall be located on the tank or at an accessible point as near to the storage tank as possible.

2. All valves shall be designed or marked to indicate clearly whether they are open or closed

3. All valves shall be capable of being locked or tagged in the closed position for servicing.

4. Gas Supply and Liquid CO_2 Fill Valves shall be clearly marked for easy identification.

D. **Safety Relief/Vent Lines** - Safety relief/vent lines shall be as short and straight as possible with a continuous routing to an unenclosed area outside the building and installed in accordance with the manufacturer's instructions.

The vent line shall be a continuous run from the vessel safety relief valve to outside vent line discharge fitting, without any splices. These lines shall be free of physical defects such as cracking or kinking and all connections shall be securely fastened to the LCDSV and the fill box.

The minimum size and length of the lines shall be in accordance with NBIC Part 1(see below). Fittings or other connections may result in a localized reduction in diameter have been factored into the lengths given by the NBIC Part 1.
Note: Due to the design of the LCDSV the discharge line may be smaller in diameter than the relief valve outlet size but shall not be smaller than that shown in NBIC Part 1, Tables S3.6 a) and b).

Minimum LCDSV System Safety Relief /Vent Line Requirements (Metallic)

Tank Size (Pounds)	Fire Flow Rate Requirements (Pounds per Minute)	Maximum length of 3/8 inch ID Metallic Tube Allowed	Maximum Length of Vi inch Metallic Tube Allowed
Less than 500	2.60 maximum	80 feet	100 feet
500-750	3.85 maximum	55 feet	100 feet
Over 750-1000	5.51 maximum	18 feet	100 feet

Minimum LCDSV System Safety Relief/Vent Line Requirements (plastic/polymer)

Tank Size (Pounds)	Fire Flow Rate Requirements (Pounds per Minute)	Maximum length of 3/8 inch ID plastic/ polymer materials Tube Allowed	Maximum Length of % inch plastic/polymer materials Tube Allowed
Less than 500	2.60 maximum	100 feet	100 feet
500-750	3.85 maximum	100 feet	100 feet
Over 750-1000	5.51 maximum	N/A see 1/2 inch	100 feet

Metric Minimum LCDSV System Safety Relief/Vent Line Requirements (Metallic)

Tank Size (Kg)	Fire Flow Rate Requirements (Kg per Minute)	Maximum length of 10mm ID Nominal Metallic Tube Allowed	Maximum Length of 13mm Metallic Tube Allowed
Less than 227	1.18 maximum	24 m	30.5 m
227-340	1.75 maximum	17 m	30.5 m
Over 340-454	2.50 maximum	5.5 m	30.5 m

Metric Minimum LCDSV System Safety Relief/Vent Line Requirements (plastic/polymer)

Tank Size (kg)	Fire Flow Rate Requirements (kg per Minute)	Maximum length of 10 mm ID Nominal plastic/polymer Tube Allowed	Maximum Length of 13 mm ID plastic/polymer materials Tube Allowed
Less than 227	1.18 maximum	30.5 m	30.5 m
227-340	1.75 maximum	30.5 m	30.5 m
Over 340-454	2.5 maximum	N/A see 13 mm	30.5 m

Note: Due to the design of the LCDSV the discharge line may be smaller in diameter than the relief valve outlet size but shall not be smaller than that shown in tables above.
Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman
Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.
History: **New Rule:** Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013. **Amended:** File December 11, 2015; effective January 28, 2016.

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CHAPTER 480-7-6
REQUIREMENTS

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480-7-6-.01 General Requirements

Ed. Note: Former Chapter 490-X-6 has been renumbered Chapter 480-7-6. Due to the merger of the Department of Industrial Relations and the Department of Labor, the Department of Industrial Relations has been dissolved and all the rules will be listed under the Department of Labor as per certification filed January 9, 2013; effective February 13, 2013.

480-7-6-.01 General Requirements.

(1) **Automatic Low-Water Fuel Cutoff and/or Water Feeding Device**

(a) 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 feedwater. The lowest safe waterline should not be lower than the lowest visible part of the water glass.

(b) Such fuel or feedwater 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.

(c) 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.

(2) **Pressure Reducing Valves**

(a) 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.

(b) 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.

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

(3) **Boiler Blowoff Equipment**

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

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

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

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

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

(4) **Location of Discharge Piping Outlets.** The discharge of safety valves, blowoff pipes, and other outlets shall be located and supported as to prevent injury to personnel.

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

(6) **Boiler Door Latches**

(a) A watertube 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.

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

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

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

(7) **Clearance**

(a) All boilers and pressure vessels shall be so located that adequate space will be provided for the proper operation of the boilers and pressure vessels and their appurtenances, for the inspection of all surfaces, tubes,

waterwalls, economizers, piping, valves, and other equipment, and for their necessary maintenance and repair and replacement of tubes.

(b) When boilers are replaced or new boilers are installed in either existing or new buildings, a recommended minimum height of 3 ft. should be provided between the top of the boiler proper and the ceiling and between all sides of the boiler and adjacent walls or other structures. Boilers and pressure vessels having manholes should have a recommended 5 ft. clearance from the manhole opening and any wall, ceiling, or piping that will prevent a person from entering the boiler or vessel.

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

(9) **Exit from Boiler Room.** All boiler rooms exceeding a 500 square foot floor area and containing one or more boilers having a fuel-burning capacity of 1 million 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.

(10) **Suggestions for Operation.** 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.

(11) **Air and Ventilation Requirements - Combustion Air Supply and Ventilation of Boiler Room**

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

1. The total requirements of the burners for all fired pressure vessels 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

(BTU/10,000) X 2.5= CFM - 300 CFM per sq. ft. of net req. area

2. When mechanical ventilation is in lieu of paragraph 1, 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.

(b) It is recommended that each boiler room be equipped with an operating carbon monoxide sensor.

Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman

Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.

History: New Rule: Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.

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CHAPTER 480-7-7
CONDITIONS NOT COVERED

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480-7-7-.01 Conditions Not Covered

Ed. Note: Former Chapter 490-X-7 has been renumbered Chapter 480-7-7. Due to the merger of the Department of Industrial Relations and the Department of Labor, the Department of Industrial Relations has been dissolved and all the rules will be listed under the Department of Labor as per certification filed January 9, 2013; effective February 13, 2013.

480-7-7-.01 Conditions Not Covered. All cases not specifically covered by these requirements shall be treated as new installations or may be referred to the chief inspector for instructions concerning the requirements.
Author: Board of Boilers & Pressure Vessels, Dr. David Dyer, Chairman
Statutory Authority: Code of Ala. 1975, §§25-12-4, -6, -14.
History: New Rule: Filed February 20, 2004; effective March 23, 2004. **Amended:** Filed January 9, 2013; effective February 13, 2013.