

CHAPTER 13 – BOILER AND PRESSURE VESSEL

SECTION .0100 - DEFINITIONS

13 NCAC 13 .0101 DEFINITIONS

The following definitions shall apply throughout the rules in this Chapter and shall be construed as controlling in case of any conflict with the definitions contained in ANSI/NB-23 National Board Inspection Code Parts 2, 3, and 4, The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or The North Carolina State Building Code:

- (1) "Accepted Design and Construction Code" means the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers (ASME Code), or a comparable code with standards that the Chief Inspector determines to be equivalent to the ASME Code.
- (2) "Appurtenance" means any control, fitting, appliance, or device attached to or working in conjunction with the boiler proper or pressure vessel.
- (3) "ASME Code" means the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers.
- (4) "Audit" means activities, other than certificate inspections, conducted by the Chief Inspector or his designee. Audits include the following:
 - (a) reviews for ASME and National Board certificate issuance and renewal;
 - (b) audits conducted of an authorized inspector at the location of a manufacturer or repair organization as may be required by the ASME Code, National Board Inspection Code, or National Board Rules for Commissioned Inspectors; and
 - (c) audits pursuant to evaluation for the issuance of North Carolina Specials.
- (5) "Automatically fired boiler" means a boiler that cycles in response to a control system and that does not require a constant attendant for the purpose of introducing fuel into the combustion chamber or to control electrical input. Electricity shall be considered a fuel for electrically fired boilers.
- (6) "Authorized Inspection Agency" means an organization employing commissioned inspectors, including the following:
 - (a) the Bureau, as defined in Item (11) of this Rule.
 - (b) an inspection agency of an insurance company licensed to write boiler and pressure vessel insurance; or
 - (c) an owner-user inspection organization that is accredited by the National Board.
- (7) "Authorized inspector" means an employee of an Authorized Inspection Agency who is commissioned by the National Board and this State, holds an endorsement on his or her National Board Commission appropriate for the work to be performed, and inspects as the third party inspector in ASME Code manufacturing facilities.
- (8) "Boiler," as defined in G.S. 95-69.9(b), includes the following types of boilers:
 - (a) "Exhibition boiler" means a historical or antique boiler that generates steam or hot water for the purposes of entertaining or educating the public or is used for demonstrations, tourist transportation, or exhibitions. This term includes boilers used in steam tractors, threshers, steam powered sawmills, and similar uses;
 - (b) "High pressure boiler" means a boiler in which steam or other vapor is generated at a pressure of more than 15 psig or water is heated to a temperature greater than 250°F and a pressure greater than 160 psig for use external to itself. High pressure boilers include the following:
 - (i) Electric boilers;
 - (ii) Miniature boilers;
 - (iii) High temperature water boilers; and
 - (iv) High temperature liquid boilers (other than water);
 - (c) "Low pressure boiler" means a boiler in which steam or other vapor is generated at a pressure of not more than 15 psig or water is heated to a temperature not greater than 250°F and a pressure not greater than 160 psig, including the following:
 - (i) "Hot water heating boiler" means a low pressure boiler that supplies heated water that is returned to the boiler from a piping system and is used normally for building heat applications (hydronic boiler);

- (ii) "Hot water supply boiler" means a low pressure boiler that furnishes hot water to be used externally to itself; and
 - (iii) "Steam heating boiler" means a low pressure boiler that generates steam to be used normally for building heat applications;
- (d) "Model hobby boiler" means a boiler that generates steam, whether stationary or mobile, and is used for the purpose of entertainment or exhibiting steam technology, where the boiler does not exceed:
 - (i) 20 square feet of heating surface;
 - (ii) a shell diameter of 16 inches;
 - (iii) a volume of 5 cubic feet; and
 - (iv) a pressure of 150 psig;
- (e) "Water heater" means a closed vessel in which water is heated by the combustion of fuel, by electricity, or by any other source, and withdrawn for potable use external to the system at pressures not exceeding 160 psig and temperatures not exceeding 210°F.
- (9) "Boiler blowoff" means the system associated with the rapid draining of boiler water to remove concentrated solids that have accumulated as a result of steam generation. This term also applies to the blowoff for other boiler appurtenances, such as the low-water fuel cutoff.
- (10) "Boiler proper" or "pressure vessel" means the internal mechanism, shell, and heads of a boiler or pressure vessel terminating at:
 - (a) the first circumferential joint for welded end connections;
 - (b) the face of the first flange in bolted flange connections; or
 - (c) the first threaded joint in threaded connections.
- (11) "Bureau" means the Boiler Safety Bureau of the North Carolina Department of Labor.
- (12) "Certificate inspection" means an inspection, the report of which is used by the Chief Inspector as justification for issuing, withholding, or revoking the inspection certificate. The term "certificate inspection" also applies to the external inspection conducted in accordance with this Chapter whether or not a certificate is intended to be issued as a result of the inspection.
- (13) "Condemned boiler or pressure vessel" means a boiler or pressure vessel:
 - (a) that has been found not to comply with G.S. Chapter 95, Article 7A, or this Chapter;
 - (b) that constitutes a menace to public safety; and
 - (c) that cannot be repaired or altered so as to comply with G.S. Chapter 95, Article 7A, and this Chapter.
- (14) "Coil type watertube boiler" means a boiler having no steam space, such as a steam drum, whereby the heat transfer portion of the water-containing space consists only of a coil of pipe or tubing.
- (15) "Commissioned inspector" means an employee of an Authorized Inspection Agency who is commissioned by the National Board and this State, holds an endorsement on his or her National Board Commission appropriate for the work to be performed, and who is charged with conducting in-service inspections of pressure equipment and inspecting repairs or alterations to that equipment.
- (16) "Defect" means any deterioration to the pressure equipment affecting the integrity of the pressure boundary or its supports. Defects may be cracks, corrosion, erosion, bags, bulges, blisters, leaks, broken parts integral to the pressure boundary such as stays, or other flaws identified by NDE or visual inspection.
- (17) "Deficiency" means any violation of the Uniform Boiler and Pressure Vessel Act, rules of this Chapter, or identified defects.
- (18) "Design criteria" means design and construction code requirements relating to the mode of design and construction of a boiler or pressure vessel.
- (19) "Equipment" means any boiler or pressure vessel subject to inspection by the Bureau.
- (20) "External inspection" means an inspection of the external surfaces and appurtenances of a boiler or pressure vessel. An external inspection may entail "shutting down" a boiler or pressure vessel while it is in operation, including inspection of internal surfaces, if the inspector determines this action is warranted.
- (21) "Hydropneumatic storage tank" means a pressure vessel used for storage of water at ambient temperature not to exceed 120°F and where a cushion of air is contained within the vessel.

- (22) "Imminent danger" means any condition or practice in any location that a boiler or pressure vessel is being operated such that a danger exists that could be expected to cause death or serious physical harm if the condition is not abated.
- (23) "Insurance inspector" means the special inspector employed by an insurance company, and holding a valid North Carolina Commission and National Board Commission.
- (24) "Internal inspection" means as complete an examination as can be made of the internal and external surfaces and appurtenances of a boiler or pressure vessel while it is shut down.
- (25) "Maximum allowable working pressure" or "MAWP" means the maximum gauge pressure as determined by employing the stress values, design rules, and dimensions designated by the accepted design and construction code or as determined by the Chief Inspector in accordance with this Chapter.
- (26) "Menace to public safety" means a boiler or pressure vessel that cannot be operated without a risk of injury to persons and property.
- (27) "Miniature boiler" means a boiler that does not exceed any of the following:
- (a) 16 inch inside shell diameter;
 - (b) 20 square feet of heating surface (does not apply to electrically fired boilers);
 - (c) 5 cubic feet volume; and
 - (d) 100 psig maximum allowable working pressure.
- (28) "National Board Commission" means the commission issued by the National Board to those individuals who have passed the National Board commissioning examination and have fulfilled the requirements of the National Board Rules for Commissioned Inspectors.
- (29) "National Board Inspection Code" or "NBIC" means the ANSI/NB-23 standard published by the National Board, as incorporated by reference under Rule .0103 of this Chapter.
- (30) "Nondestructive examination" or "NDE" means examination methods used to verify the integrity of materials and welds in a component without damaging its structure or altering its mechanical properties. NDE may involve surface, subsurface, and volumetric examination. Visual inspection, x-rays, and ultrasound are examples of NDE.
- (31) "Nonstandard boiler or pressure vessels" means:
- (a) high pressure boilers contracted for or installed before December 7, 1935;
 - (b) heating boilers contracted for or installed before January 1, 1951;
 - (c) pressure vessels contracted for or installed before January 1, 1976;
 - (d) hydropneumatic storage tanks contracted for or installed before January 1, 1986; and
 - (e) boilers or pressure vessels to which the ASME Code is not intended to apply, other than those boilers and pressure vessels to which the term North Carolina Special applies.
- (32) "Normal working hours" means between the hours of 6:00 AM and 6:00 PM, Monday through Friday, except for State recognized holidays established in 25 NCAC 01E .0901.
- (33) "North Carolina Commission" means the commission issued by the Commissioner to those individuals who have passed the examination administered by the Chief Inspector relating to the Uniform Boiler and Pressure Vessel Act and the rules of this Chapter, and who also hold a National Board Commission, authorizing them to conduct inspections in this State.
- (34) "North Carolina Special" means a boiler or pressure vessel that is not constructed in compliance with the Accepted Design and Construction Code as defined in Item (1) of this Rule and for which the owner or operator shall apply for a special inspection certificate with the Chief Inspector.
- (35) "NPS" means nominal pipe size.
- (36) "Nuclear component" means the items in a nuclear power plant such as pressure vessels, piping systems, pumps, valves, and component supports.
- (37) "Nuclear system" means a system comprised of nuclear components that serve the purpose of producing and controlling an output of thermal energy from nuclear fuel and includes those associated systems essential to the function and overall safety of the power system.
- (38) "Operating pressure" means the pressure at which a boiler or pressure vessel operates. It shall not exceed the MAWP except as shown in Section I of the ASME Code for forced-flow steam generators.
- (39) "Owner or user" means any person or legal entity responsible for the operation of any boiler or pressure vessel installed in this State. This term also applies to a contractor, installer, or agent of the owner or user.

- (40) "Owner-user inspector" means an individual who holds a valid North Carolina Commission and National Board Commission and is employed by a company operating pressure vessels for its own use and not for resale and maintaining an inspection program that meets the requirements of the National Board for periodic inspection of pressure vessels owned or used by that company.
- (41) "Pressure piping" means piping, including welded piping, external to high pressure boilers from the boiler proper to the required valve(s).
- (42) "Pressure relief devices" mean the devices on boilers and pressure vessels set to open and relieve the pressure in the event of an over-pressurization event, and include the following:
 - (a) "Non-reclosing pressure relief device" means a pressure relief device designed to remain open after operation; and
 - (b) "Pressure relief valve" means a pressure relief device that is designed to reclose and prevent the further flow of fluid after normal conditions have been restored. These devices include:
 - (i) "Relief valve" means an automatic pressure relief valve that is actuated by static pressure upstream of the valve that opens further with the increase in pressure over the opening pressure;
 - (ii) "Safety relief valve" means an automatic pressure relief valve that is actuated by static pressure upstream of the valve and characterized by full opening pop action or by opening in proportion to the increase in pressure over the opening pressure; and
 - (iii) "Safety valve" means an automatic pressure relief valve that is actuated by static pressure upstream of the valve and characterized by full opening pop action.
- (43) "PSIG" means pounds per square inch gauge.
- (44) "Reinspection or Follow-Up Inspection" means an examination necessary to verify that any repair or corrective action required as a result of a certificate inspection is completed.
- (45) "Service vehicle" means a vehicle mounted with an air storage tank that services vehicles and equipment in the field away from the owner's shop.
- (46) "Shop inspection" means an inspection conducted by an Authorized Inspector or a Commissioned Inspector pursuant to an inspection service agreement whereby the fabrication process or the repair or alteration of a boiler or pressure vessel is observed to ensure compliance with the ASME Code and the NBIC.
- (47) "Special inspection" means any inspection conducted by a Deputy Inspector other than a regularly scheduled inspection, including the performance of an inspection by a Deputy Inspector that requires that the inspector make a special trip to meet the needs of the individual or organization requesting the inspection, conducting certificate inspections during hours other than normal working hours, and inspection of field repairs and alterations. A special inspection may be considered any inspection or activity not otherwise described in these Rules.
- (48) "Special inspector" means a National Board commissioned inspector employed by an insurance company authorized to write boiler and pressure vessel insurance in the State of North Carolina.
- (49) "Violation" means the failure to comply with the requirements of the Uniform Boiler and Pressure Vessel Act or this Chapter.

History Note: Authority G.S. 95-69.11; 95-69.14;
 Eff. May 29, 1981;
 Temporary Amendment [(16)]; Eff. March 10, 1982, for a Period of 120 Days to Expire on July 8, 1982;
 Amended Eff. March 1, 2017; March 1, 2015; July 1, 2011; January 1, 2009; July 1, 2006;
 January 1, 1995; January 1, 1987; January 1, 1986; June 1, 1982;
 Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
 Amended Eff. April 1, 2022.

13 NCAC 13 .0102 CONTROLLING DEFINITIONS

History Note: Authority G.S. 95-69.11; 95-69.14;
 Eff. May 29, 1981;

Repealed Eff. July 1, 2006.

13 NCAC 13 .0103 INCORPORATED - STANDARDS

(a) The following standards are incorporated by reference, including subsequent amendments and editions of the standards:

- (1) The ANSI/NB-23 National Board Inspection Code (NBIC) Parts 2, 3, and 4. Copies of the ANSI/NB-23 National Board Inspection Code Parts 2, 3, and 4 are available for inspection at the offices of the Bureau and may also be obtained from the National Board of Boiler and Pressure Vessel Inspectors, via U.S. Mail at 1055 Crupper Avenue, Columbus, Ohio 43229, via telephone at (614) 888-8320, or via the internet at www.nationalboard.org. The costs, which does not include shipping and handling, are as follows:
 - (A) Complete Set (printed or PDF), Parts 1-4: \$325.00;
 - (B) Individual (printed), Part 2: \$150.00;
 - (C) Individual (printed), Part 3: \$150.00;
 - (D) Individual (printed), Part 4: \$115.00; or
 - (E) Bundled Set (printed and PDF), Parts 1-4: \$435.00.
- (2) The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Copies of the complete set of the ASME Code are available for inspection at the offices of the Bureau and may also be obtained from the American Society of Mechanical Engineers, via U.S. Mail at 150 Clove Road, 6th Floor, Little Falls, New Jersey 07424-2139, via telephone at (800) 843-2763, via facsimile at (973) 882-1717 or (800) 843-2763, via email at customer-care@asme.org, or via the internet at www.asme.org. The cost is seventeen thousand nine hundred and forty-five dollars (\$17,945) for the complete 2021 edition of the code.
- (3) The North Carolina State Building Code. Copies of the North Carolina State Building Code are available for inspection at the offices of the Bureau and may also be obtained from the North Carolina Department of Insurance, Office of the State Fire Marshal, Engineering & Codes, 325 North Salisbury Street, Raleigh, North Carolina, 27603. The cost of a North Carolina State Building Code, 2018 edition, is one hundred twenty nine dollars (\$129.00) for walk-in clients; prices differ for digital versions, when ordering online, and for members of the International Code Council. The codes may be ordered via the internet at <https://www.ncosfm.gov/codes>.

(b) The rules of this Chapter shall control when any conflict between these Rules and the standards cited in Subparagraphs (a)(1) and (2) of this Rule exists. In the event that a conflict between these Rules and the North Carolina State Building Code exists, the more stringent standard prevails and shall be adhered to.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. January 1, 1995;
Amended Eff. July 1, 2011; July 1, 2006;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022.*

SECTION .0200 - ADMINISTRATION

13 NCAC 13 .0201 NAME: ADDRESS

(a) The Boiler Safety Bureau, which administers the provisions of Article 7A of G.S. Chapter 95, is located at the following physical address:

North Carolina Department of Labor
Boiler Safety Bureau
Old Revenue Building
111 Hillsborough Street
Raleigh, North Carolina 27603.

(b) All correspondence shall be addressed to the following mailing address:

North Carolina Department of Labor
Boiler Safety Bureau
1101 Mail Service Center
Raleigh, North Carolina 27699-1101

Telephone (919) 707-7918
Fax (919) 707-7960.

History Note: Authority G.S. 95-69.12;
Eff. May 29, 1981;
Amended Eff. July 1, 2006; January 1, 1995; June 1, 1992;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22,
2018;
Amended Eff. April 1, 2022; January 1, 2020.

13 NCAC 13 .0202 INSPECTOR QUALIFICATION

- (a) Deputy Inspectors conducting certificate inspections shall be in possession of a valid North Carolina Commission. Special Inspectors and Owner-User Inspectors shall be in possession of a National Board Commission and a North Carolina Commission.
- (b) A North Carolina Commission shall be issued to an inspector who:
- (1) has attained a passing grade of 70 percent or higher on an examination administered by the Chief Inspector relating to the Uniform Boiler and Pressure Vessel Act and the rules of this Chapter; and
 - (2) meets all other criteria as set forth in the Uniform Boiler and Pressure Vessel Act and this Chapter.
- (c) If a North Carolina Commissioned inspector does not conduct at least one certificate inspection in North Carolina per calendar year, the inspector must retake and pass this examination before becoming commissioned again in this State. A certificate inspection shall be an inspection as described in Rule .0211 of this Chapter.
- (d) National Board examinations are administered by the National Board of Boiler and Pressure Vessel Inspectors. Information on the examinations may be found on the National Board web site at www.nationalboard.org or by telephone at (614) 888-8320.
- (e) The National Board Inservice Inspector examination covers the installation, operation, and inspection of boilers and pressure vessels and their appurtenances. A grade of 70 percent or higher must be attained to achieve a passing grade on the examination.

History Note: Authority G.S. 95-69.11; 95-69.15;
Eff. May 29, 1981;
Amended Eff. July 1, 2011; January 1, 2009; July 1, 2006; January 1, 1995; September 1, 1986;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22,
2018;
Amended Eff. April 1, 2022.

13 NCAC 13 .0203 NORTH CAROLINA COMMISSION

- (a) When requested by the employer and upon presentation of a completed Application for Commission as an Inspector of Boilers and Pressure Vessels, a North Carolina Commission, bearing the signature of the Commissioner or Chief Inspector, shall be issued by the Chief Inspector to persons holding a valid National Board Commission who have taken and passed the examination specified in 13 NCAC 13 .0202(b).
- (b) Applications for a North Carolina Commission shall be processed upon proof of a National Board Commission and payment of a thirty-five dollar (\$35.00) fee to the Department of Labor.
- (c) North Carolina Commissions shall be valid on an annual basis through December 31, at which time the inspector's employer shall submit a renewal request letter and a thirty-five dollar (\$35.00) fee to the Department of Labor.
- (d) The North Carolina Commission shall be returned by the employing company with notification of termination date to the Bureau within 30 days of termination of employment.
- (e) A North Carolina Commission may be suspended or revoked by the Commissioner in accordance with G.S. 95-69.11(20). Failure to conduct inspections in accordance with this Chapter shall constitute incompetence. Falsification of any statement in an application or inspection report, including a failure to inspect, shall constitute dishonesty. Suspension or revocation of a North Carolina Commission shall be based on evidence of incompetence or dishonesty.
- (f) The Commissioner shall give notice of the commencement of proceedings for suspension or revocation of a commission pursuant to G.S. 150B-23. A North Carolina Commission may be suspended prior to the hearing if the Chief Inspector determines that, as a result of an inspector incompetence or dishonesty, the public health, safety, or welfare, is put at risk, the proceedings shall be promptly commenced and determined in accordance with G.S. 150B-

3. The Commissioner's decision regarding the competency of an inspector shall be determined after comparing the inspector's knowledge, skill, and care taken during inspections with that possessed and employed by boiler and pressure vessel inspection personnel in good standing. Industry custom and practice shall be considered but are not determinative. The Commissioner shall give the inspector opportunity to show that he or she is conducting his or her duties in a competent manner and that suspension or revocation is unwarranted. If the inspector believes that the decision of the Commissioner is not warranted, the inspector may take exception to the determination, in which event the inspector may appeal the final determination of the action pursuant to G.S. 150B.

History Note: Authority G.S. 95-69.11; 95-69.15;
Eff. May 29, 1981;
Amended Eff. March 1, 2017; March 1, 2015; July 1, 2011; January 1, 2009; July 1, 2006;
January 1, 1995; March 2, 1992; September 1, 1986;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22,
2018;
Amended April 1, 2022.

13 NCAC 13 .0204 CONFLICT OF INTEREST

No one holding a commission in North Carolina shall engage in any conduct or endeavor that would constitute a conflict of interest including the following:

- (1) Ownership or employment in any kind of boiler or pressure vessel sales or service business;
- (2) Ownership or employment in any kind of boiler or pressure vessel parts or appurtenances sales or service business;
- (3) Consultative services for accepted design and construction codes or National Board quality program design or implementation; or
- (4) Inspection services outside the purview of the employing entity.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. July 1, 2011; January 1, 2009; July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22,
2018.

13 NCAC 13 .0205 OWNER-USER INSPECTION ORGANIZATION

(a) A company seeking to conduct inspections of its own pressure vessels shall file an application with the Chief Inspector, accompanied by the Certificate of Accreditation issued by the National Board as an Owner-User Inspection Organization.

(b) The company shall, in its application, designate a supervisor who shall be an engineer within its employ who, upon approval of the application, shall:

- (1) ascertain that the company's inspectors, pursuant to Rules .0202 and .0203 of this Section, are issued National Board Commission cards;
- (2) supervise inspections of pressure vessels and ensure that an inspection report, signed by the owner-user inspector, is filed at the equipment site;
- (3) notify the Chief Inspector of any unsafe pressure vessel that presents a condition of imminent danger;
- (4) maintain a master file of inspection records that shall be available for examination by the Chief Inspector or his representative during business hours and contain the following:
 - (A) identifying each pressure vessel by serial number and abbreviated description; and
 - (B) showing the date of the last and next scheduled inspection; and
- (5) on a date agreed upon with the Chief Inspector, file an annual statement signed by the supervisor showing the number of boilers and certifying that each inspection was conducted pursuant to this Chapter, accompanied by an administrative fee of fifty dollars (\$50.00) per vessel.

(c) Inspection certificates shall not be required for pressure vessels inspected under an owner-user program.

History Note: Authority G.S. 95-69.11; 95-69.15; 95-69.16;
Eff. May 29, 1981;

Amended Eff. March 1, 2017; March 1, 2015; January 1, 2009; July 1, 2006; January 1, 1995; March 2, 1992; September 1, 1986;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022.

13 NCAC 13 .0206 OWNERS OR USERS TO NOTIFY CHIEF INSPECTOR OF ACCIDENTS

- (a) The owner or user of a boiler or pressure vessel shall notify the Chief Inspector within 24 hours when a device is rendered inoperative due to an over pressurization, dry firing or any related event that causes damage to the equipment, real or personal property, personal injury, or death.
- (b) No person shall remove or disturb the boiler, pressure vessel, or any of its parts, before an investigation by the Chief Inspector or designee has been made, except for the purpose of conserving life or limiting consequential damages.
- (c) Insurance inspectors who elect to investigate an accident shall not have equipment removed from the location until an investigation has been made by the Chief Inspector or designee.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. January 1, 2009; July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0207 INSPECTION REPORTS

- (a) Inspectors shall file inspection reports with the Chief Inspector:
- (1) within 10 working days after the date each inspection is performed;
 - (2) immediately for all conditions of imminent danger, or any condition that would result in the insurance company's refusal to issue or continue an insurance policy on the boiler or pressure vessel; and
 - (3) shall include the insurance policy identifier covering any equipment inspected by a special inspector.
- (b) Inspectors shall notify the Chief Inspector, in person or by electronic means, upon becoming aware of an accident which renders a boiler or pressure vessel inoperative or causes damage to property, personal injury, or death.
- (c) Should the inspector, during the course of making an inspection, find a condition of imminent danger, he shall immediately notify the Chief Inspector, in person or by electronic means, so that steps might be taken to remove the device from service.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022.

13 NCAC 13 .0208 INSURANCE COMPANIES TO NOTIFY CHIEF INSPECTOR

- (a) All insurance companies shall notify the Chief Inspector within 30 days if any of the following actions are taken concerning boiler or pressure vessels:
- (1) the issuance of a policy;
 - (2) the cancellation of a policy; or
 - (3) removal of a boiler or pressure vessel from service.
- (b) All insurance companies shall notify the Chief Inspector within 10 days regarding the non-renewal or suspension of a policy because of unsafe conditions.
- (c) Notification for items listed under Paragraph (a) of this Rule shall be made by using the National Board form NB-4, or a form determined by the Chief Inspector to be equivalent to the National Board form. Notifications under Paragraph (b) of this Rule shall be made by telephone at (919) 707-7918, email at boiler.safety@labor.nc.gov or

overnight mail to 1101 Mail Service Center, Raleigh, NC 27699-1101 or package delivery service to the Boiler Safety Bureau, 4 West Edenton Street, Raleigh, NC 27601. All notifications shall include reference to the following:

- (1) Object, date of service and effective date;
- (2) Owner's number;
- (3) Jurisdiction number;
- (4) National Board number;
- (5) Name of manufacturer;
- (6) Name of owner including county;
- (7) Location of object including county;
- (8) User of object;
- (9) Date of last inspection for certificate;
- (10) Whether or not a certificate of inspection was issued; and
- (11) Reason for discontinuance or cancellation.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. July 1, 2011; January 1, 2009; July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. January 1, 2020.*

13 NCAC 13 .0209 INSTALLERS TO NOTIFY CHIEF INSPECTOR

Any company or individual installing boilers or pressure vessels subject to inspection in accordance with this Chapter shall notify the Chief Inspector and request a certificate inspection not less than 10 working days prior to placing equipment in operation. Any company or individual wishing to install used boilers or pressure vessels that are subject to this Chapter shall request permission using the Used Boiler/Pressure Vessel Installation Request Form found on the Boiler Safety Bureau website. Equipment shall not be operated, other than for testing, prior to an inspection being conducted that finds the boiler or pressure vessel to be in compliance with this Chapter.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. July 1, 2011; July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. January 1, 2020.*

13 NCAC 13 .0210 SHOP INSPECTIONS AND NATIONAL BOARD "R" CERTIFICATE QUALIFICATION REVIEWS

(a) Shop Inspections.

- (1) Manufacturers or repair firms seeking to employ the Boiler Safety Bureau to act as their Authorized Inspection Agency pursuant to the ASME Code or National Board Inspection Code, shall enter into a written agreement with the North Carolina Department of Labor, Boiler Safety Bureau for this purpose.
- (2) An audit of the Deputy Inspector serving as the Authorized Inspector pursuant to Subparagraph (a)(1) of this Rule, and the contracting company in which he or she is working shall be conducted on an annual basis. The contracting company shall pay the audit fees required in Rule .0213 of this Section.

(b) National Board "R" Certificate Qualification Reviews

- (1) The Chief Inspector, or the Chief Inspector's designee, shall conduct the qualification reviews for issuance or renewal of the National Board "R" certificate of authorization pursuant to the National Board Inspection Code as adopted, except as provided in Subparagraph (b)(2) of this Rule.
- (2) The Chief Inspector or his designee shall not conduct the qualification reviews of those companies for which the Boiler Safety Bureau provides inspection services, or those companies which specifically request the review be conducted by the National Board.
- (3) A review to be conducted by the Boiler Safety Bureau shall be scheduled upon receipt of request by the National Board.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. March 1, 2015; October 1, 2008; July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22,
2018;
Amended Eff. April 1, 2022.*

13 NCAC 13 .0211 CERTIFICATE INSPECTIONS

- (a) A commissioned inspector shall inspect all boilers and pressure vessels at the time of installation and at regular intervals thereafter, as provided in this Rule.
- (b) Subject to the exceptions in Paragraphs (c) and (d) of this Rule, and after seven days' notice is given to the owner or user, an inspector shall conduct an internal inspection of a high pressure boiler at the time of installation and annually thereafter. An external inspection shall be conducted a minimum of once every 12 months while the boiler is in operation. The inspector shall ensure that the safety controls are operating as required. Issuance of the inspection certificate shall be based on the results of the internal inspection; however, if the inspector determines during the external inspection that an imminent danger exists, the inspector shall notify the Chief Inspector pursuant to 13 NCAC 13 .0301(d).
- (c) In place of the first internal inspection of a new high pressure boiler, an inspector may conduct an external inspection if the inspector determines that data sufficient to determine compliance with the rules of this Chapter can be gathered from an external inspection. This shall not apply to relocated used boilers or those for which extended inspection certificates are being requested.
- (d) Miniature boilers, coil-type watertube boilers, and boilers heating a fluid other than water which do not produce steam or vapor operating as high pressure boilers shall undergo an external inspection annually. Miniature boilers, coil-type watertube boilers, and boilers heating a fluid other than water operating as heating boilers shall undergo an external inspection biennially. Hobby boilers, locomotive boilers, and exhibition boilers shall be inspected annually, at the beginning of the season when they are anticipated to be operated.
- (e) Low pressure boilers and pressure vessels, except hydropneumatic storage tanks, shall undergo an external inspection biennially while in operation.
- (f) Owner-user inspectors shall conduct inspections for pressure vessels as prescribed in this Rule.
- (g) Inspectors may order coverings removed, internal inspections, external inspections, removal of internal parts, testing or calibration of controls, indicating and safety devices and pressure tests whenever conditions warrant further evaluation of the pressure equipment. The inspector may also require the boiler to be started to verify the operating controls.
- (h) Hydropneumatic storage tanks shall undergo an external inspection every four years while in operation.
- (i) When the inspector or Chief Inspector determines that a certificate cannot be issued as a result of an inspection, the boiler or pressure vessel shall be reinspected after the necessary repairs are made.
- (j) Inspections shall be conducted in accordance with the National Board Inspection Code. The inspector may require controls, indicating, and safety devices to be disassembled, tested, checked, or calibrated as necessary to ensure their proper operation.
- (k) The Chief Inspector may extend an existing inspection certificate for a high pressure boiler for a period not exceeding 90 days beyond the certificate expiration date. The owner or user shall submit a written request to extend an existing inspection certificate, providing justification for an extension. The request shall include a report from a commissioned inspector of an external inspection which shall have been conducted no earlier than 60 days before the certificate expiration date, and the inspection report shall include a recommendation from the inspector for an extension to the inspection certificate.
- (l) The inspection frequency established by this Rule may be modified by the Chief Inspector for individual boilers and pressure vessels if the Chief Inspector determines the frequency established herein is not appropriate, and that the safety attained by the normal inspection frequency will be otherwise obtained. Requirements for extended certificates for pressure equipment are detailed in Rule .0214 of this Chapter. Pressure vessels in "Locked High Radiation" areas may be certified for up to five years and may be inspected in accordance with Paragraph (m) of this Rule.
- (m) Pressure retaining items which contain highly hazardous chemicals or biological elements that require level B personal protective equipment, or are in highly hazardous areas or pressure retaining items containing radioactive materials causing the pressure equipment to be classified as "Locked High Radiation," may be inspected remotely by video provided:

- (1) there is a listing of all the items under this criterion at the site. The list shall be kept current by the owner/user and any additions or deletions shall be kept current. Prior to inspection the inspector shall review the last inspection certificate, the ASME data report, any National Board ("NB") repair/alteration forms and any records of testing performed during the certificate period;
- (2) each item shall be inspected by means of live video feed that is monitored by the inspector. The inspector shall remain in radio contact with the individual operating the video equipment;
- (3) the inspector shall be in proximity to the item and shall witness the video equipment operator enter the location of the item;
- (4) a scan as complete as possible (within the limitations of the equipment) of all the pressure boundaries shall be witnessed by the inspector;
- (5) the ASME nameplate shall be viewed as well as the ASME/NB nameplate on any pressure relieving device on the item;
- (6) follow up inspections to verify the correction of deficiencies can be performed with a video inspection using the items outlined herein by the inspector;
- (7) the inspector shall submit an inspection report for each pressure retaining item at intervals specified in this Rule and the report shall be annotated indicating that the item was inspected pursuant to this Paragraph; and
- (8) any incident that renders the item inoperative shall be reported to the Bureau by the owner/user or the inspector within 24 hours.

History Note: Authority G.S. 95-69.11; 95-69.14; 95-69.17; Eff. May 29, 1981; Amended Eff. August 1, 2011; July 1, 2006; January 1, 1995; March 2, 1992; Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018; Amended Eff. April 1, 2022.

13 NCAC 13 .0212 PREPARATION FOR INSPECTION

(a) The owner or user shall prepare a high pressure boiler, including locomotive, hobby and exhibition boilers, for internal inspection by:

- (1) cooling the boiler, furnace, and setting so as to prevent damage to any part;
- (2) draining and washing internal parts to be inspected, including disassembly and cleaning of float bowl type low-water fuel cutoff devices and associated piping plugs or caps;
- (3) removing wash-out, drain, and inspection plugs;
- (4) removing enough of the grates in an internally fired boiler to permit inspection;
- (5) removing soot, ashes and unburned solid fuel plus enough brickwork, refractory, and insulation to permit inspection;
- (6) removing manhole and handhole plates;
- (7) preparing the controls and safety devices for inspection and testing;
- (8) preventing leakage of water, steam, or vapors into boiler interiors that would endanger personnel;
- (9) providing adequate ventilation to prevent the accumulation of hazardous gasses; and
- (10) providing, when requested by the inspector, a competent person, as defined under the North Carolina Occupational Safety & Health standard for confined spaces, to assist the inspector in the performance of his inspection.

(b) In addition to the requirements in Paragraph (a) of this Rule, the owner or user shall prepare a high pressure boiler that has a manhole and which is connected to a common header with another boiler for internal inspection by:

- (1) closing and tagging, or padlocking, the steam stop valves and opening all drain valves or cocks located between the steam stop valves;
- (2) closing and tagging, or padlocking, the feed and check valves and opening all drain valves or cocks located between the feed and check valves;
- (3) draining boiler and then closing and padlocking the blowoff valves;
- (4) disconnecting, at the request of the inspector, blowoff lines between pressure parts and valves;
- (5) opening all drains and vent lines;
- (6) closing and tagging or padlocking all fuel valves, blower or fan motors and any other devices that may deliver energy in any form to the boiler; and
- (7) after complying with all other provisions of this Rule, removing the manhole covers.

(c) The owner or user need not make any special preparation for an external inspection of a boiler or pressure vessel, except that if the inspector requires the boiler or pressure vessel to be shut down for a closer inspection, the boiler or pressure vessel shall be prepared as is required for the internal inspection of a high pressure boiler.

*History Note: Authority G.S. 95-69.11;
Eff. May 29, 1981;
Amended Eff. July 1, 2011; July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0213 CERTIFICATE AND INSPECTION FEES

(a) An owner shall pay a fifty dollar (\$50.00) certificate and processing fee to the North Carolina Department of Labor for each boiler or pressure vessel inspected by an Insurance Inspector and found to be in compliance with the rules in this Chapter.

(b) An owner shall pay an inspection and certificate fee to the North Carolina Department of Labor for each boiler or pressure vessel inspected by a Deputy Inspector as follows:

Boilers - An inspection of a boiler where the heating surface is:	External	Internal
Less than 500 sq. ft.	\$50.00	\$85.00
500 or more sq. ft. but less than 5000 sq. ft.	\$120.00	\$235.00
5000 or more sq. ft.	\$330.00	\$600.00
Cast iron boilers	\$50.00	\$80.00
Locomotive boilers (Antique Exhibition/Show)	N/A	\$150.00
Exhibition boilers (Antique Exhibition/Show)	N/A	\$50.00
Hobby boilers	N/A	\$50.00
Pressure Vessels - An inspection of a pressure vessel, other than a heat exchanger, where the product of measurement in feet of the diameter or width, multiplied by its length is:	External	Internal
Less than 50	\$50.00	\$60.00
50 or more but less than 70	\$85.00	\$135.00
70 or more	\$135.00	\$190.00
Heat Exchangers - An inspection of a heat exchanger, where the heating surface is:	External	
500 or more sq. ft. but less than 1000 sq. ft.	\$60.00	
Less than 500 sq. ft.	\$50.00	
1000 or more sq. ft. but less than 2000 sq. ft.	\$90.00	
2000 or more sq. ft. but less than 3000 sq. ft.	\$130.00	
3000 or more sq. ft.	\$180.00	

(c) In addition to the fees established in Paragraph (b) herein, a fee of ninety dollars (\$90.00) per hour, including travel time, plus each expense allowed by G.S. 138-6 and 138-7 and the standards and criteria established thereto by the Office of State Budget and Management's State Budget Director, at the applicable state rate shall be paid to the North Carolina Department of Labor for each special inspection as defined by 13 NCAC 13 .0101(46) and for all inspections performed outside of normal working hours as defined by 13 NCAC 13 .0101(31).

(d) A fee of three-hundred fifty dollars (\$350.00) per one-half day (four hours) or any part of one-half day or five-hundred sixty-dollars (\$560.00) for one day (four to eight hours) plus, in either case, each expense allowed by G.S. 138-6 and 138-7 and the standards and criteria established thereto by the Office of State Budget and Management's State Budget Director, at the applicable state rate shall be paid to the North Carolina Department of Labor for each shop inspection as defined by 13 NCAC 13 .0101(45).

(e) A fee of four hundred fifty dollars (\$450.00) per one-half day (four hours) or any part of one-half day or six hundred ninety dollars (\$690.00) for one day (four to eight hours), plus, in either case, each expense allowed by G.S. 138-6 and 138-7 and the standards and criteria established thereto by the Office of State Budget and Management's State Budget Director, at the applicable state rate shall be paid to the North Carolina Department of Labor for audits as defined by 13 NCAC 13 .0101(4).

History Note: Authority G.S. 95-69.11;

Eff. May 29, 1981;
Amended Eff. January 1, 1995; March 2, 1992; September 1, 1986;
Temporary Amendment Eff. March 11, 1997;
Temporary Amendment Eff. March 11, 1997 expired on December 27, 1997;
Temporary Amendment Eff. December 10, 1997;
Amended Eff. March 1, 2015; July 1, 2006; March 1, 2006; August 1, 1998;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022.

13 NCAC 13 .0214 EXTENDED PRESSURE EQUIPMENT OPERATING CERTIFICATES

(a) G.S. 95-69.16 and 13 NCAC 13 .0211(l) of this Chapter allows the Commissioner, as delegated to the Chief Inspector, to modify the inspection frequency for individual pressure equipment if it is determined that the new frequency will provide for the safety attained by the normal inspection frequency as defined in this Chapter. Maintenance programs, the condition of the pressure equipment, and a baseline inspection help to determine if the equipment is eligible for extended certification. The Chief Inspector may allow certificate renewal frequencies of up to three years. Companies wishing to have their pressure equipment given an extended certification must apply by letter to the Chief Inspector requesting extended certification.

(b) For a first time extended inspection frequency, the following shall apply to both new and existing equipment:

- (1) Base Line Inspections: At the outset of an extended inspection frequency, a base line inspection must be conducted of all inside and outside accessible pressure boundaries. The inspected area shall be examined visually by a North Carolina Department of Labor, Boiler Safety Bureau Inspector Supervisor along with a Deputy Inspector for evidence of cracking, discoloration, wear, pitting, bulging, blistering, corrosion and erosion, arc strikes, gouges, dents, and other signs of surface irregularities. Areas that are suspect shall be non-destructively examined, as defined in this Chapter, by a method acceptable to the Inspector Supervisor and Deputy Inspector. For areas that are still suspect after such examination, a more thorough supplemental examination and engineering evaluation of the discontinuities shall be conducted and discussed with the Chief Inspector or designee;
- (2) Inspection Mapping and Records: An inspection grid map shall be constructed for each pressure component detailing the areas found suspect. The grid shall not exceed four inch square. Suspect area shall be described in detail and photographs of such areas shall be taken. These records shall be kept and made available to the Deputy Inspector prior to the next required inspection;
- (3) Base Line Inspection of Boiler Tubes: The boiler tubes shall be examined by nondestructive examination. Tubes shall be examined for wear, corrosion, erosion, thinning, bulging, blistering, dents, discoloration, cracking and any other surface irregularities. Areas that are suspect shall be noted and discussed with the Inspector Supervisor and Deputy Inspector; and
- (4) Boiler Tube Inspection Mapping and Record: Where suspect tubes are identified, the boiler tubes shall be numbered in a logical sequence and the location of any suspect area shall be precisely defined and described in detail. Photographs of such areas shall be taken. These records shall be kept and made available to the Inspector Supervisor and Deputy Inspector prior to the next required inspection.

(c) Scheduling of Inspections for Extended Certificate: Approximately two months prior to a scheduled outage in which the boiler can be inspected, and prior to the current certificate expiration, the owner shall do the following in order to initiate the inspection process:

- (1) Send a letter addressed to the Chief Inspector requesting the extended certificate;
- (2) Contact the North Carolina Department of Labor, Boiler Safety Bureau at 919-707-7918 and request to speak with an Inspector Supervisor for the purpose of scheduling the inspections required for extending the boiler inspection certificate expiration for to up to 36 months; and
- (3) Agree with the Inspector Supervisor and Deputy Inspector on a date to meet for the external inspection of the boiler and to review reports. The boiler must be operating when the external inspection is done. Heat recovery boilers with less than one percent capacity factor per year may be excluded from the need to operate during the external inspection but a letter requesting the exclusion must be sent to the Chief Inspector stating the capacity factor for the year before such an exclusion request can be granted.

(d) External Inspection: All report forms may be obtained from either NBIC or ASME. The following reports must be available to the Inspector Supervisor and Deputy Inspector at the external inspection:

- (1) NBIC R1 forms for the past five years for initial inspections and since the previous inspection for renewals;
- (2) A list of alterations scheduled, and those alterations done since the last internal inspection with the NBIC R2 forms;
- (3) Safety valve testing and repair reports for the past five years for initial inspections and since the previous inspection for renewals;
- (4) Fitness for Service reports for headers for the past five years for initial inspections and since the previous inspection for renewals. All Fitness for Service reports shall be documented on the National Board Form NB-403 or other created form that includes all information required on the Form NB-403;
- (5) Side elevation drawing of the boiler (8 ½ inches by 11 inches);
- (6) Steam & Mud drums - Original drum thickness, drawings, and manufacturer's data reports if available;
- (7) Copy of the last operating certificate and copies of the last three years of inspection reports;
- (8) Reports of annual external inspections by owner's insurance company or a Boiler Safety Bureau Deputy Inspector.

(e) Equipment inspection requirements during outage or shut-down:

- (1) An operational test for all safety valves shall be conducted after the equipment has been restarted. After the operational test, the organization performing the test shall affix an updated inspection tag to the valve. The Deputy Inspector shall verify the updated inspection tag and review any associated test report. In lieu of operational tests, it is acceptable to replace safety valves with new valves or valves reworked by a National Board "VR" or "NVR" authorized company;
- (2) Inspect the pressure equipment internally; and
- (3) Inspect the drums and shells using the following methods:
 - (A) Examine penetrations into the drum or shell wall for cracking: if the nozzles are visible from inside the drum or shell, then a visual examination is satisfactory; otherwise ultrasonically examine the nozzles, from the outside surface, of at least 20 percent of the pressure equipment nozzles;
 - (B) Visually examine inside the heads; and
 - (C) When access permits, crawl through the drum or shell for a visual examination.

(f) Setting the Certificate Interval: If the requirements of this Rule are met, the Deputy Inspector shall submit an inspection report to the Chief Inspector with the recommendation for the extended certificate.

(g) Follow-up and Interim Inspections: External inspections of high pressure boilers are required six months after the certificate renewal, and then annually thereafter. The external inspections may be performed by the Boiler Safety Bureau Deputy Inspectors or by the owner's insurance inspector. The results of the inspection shall be documented on an inspection report and submitted to the Chief Inspector, North Carolina Department of Labor, Boiler Safety Bureau.

*History Note: Authority G.S. 95-69.11; 95-69.14; 95-69.16;
Eff. July 1, 2011;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022; January 1, 2020.*

SECTION .0300 - ENFORCEMENT OF STANDARDS

13 NCAC 13 .0301 INSPECTION DOCUMENTATION

- (a) The inspector shall document the results of the inspection on a written inspection report or in an electronic format recognized by the Chief Inspector.
- (b) If the inspector finds that the boiler or pressure vessel is in compliance with the rules in this Chapter, he shall indicate on the report that the boiler or pressure vessel is satisfactory.
- (c) If the inspector finds the boiler or pressure vessel is not in compliance with the rules in this Chapter, he shall specify on the inspection report the deficiencies and the required repairs or corrective action.

(d) The inspector shall determine if the deficiency is such that operation of the boiler or pressure vessel creates a condition of imminent danger. If a condition of imminent danger exists, the inspector shall state on the inspection report that operation of the boiler or pressure vessel is to cease until completion of the necessary repairs or corrective action. The inspector shall notify the Chief Inspector upon discovery of any condition of imminent danger.

(e) If the condition of the boiler or pressure vessel is such that repairs or corrective action cannot bring the boiler or pressure vessel into compliance, the inspector shall recommend to the Chief Inspector that the boiler or pressure vessel be condemned from further use.

(f) For inspections revealing deficiencies, the inspector shall provide the owner/user contact with specific information regarding the violation. The Bureau shall generate a Notice of Violation letter and send to the owner/user. The Notice of Violation shall outline the violation(s), the required corrective action, and the date by which the corrective action shall be completed.

(g) The Bureau shall issue an invoice to the owner or user for the inspections made and for issuance of the inspection certificate. The owner or user shall remit payment as indicated on the invoice within 30 days to the North Carolina Department of Labor.

*History Note: Authority G.S. 95-69.11; 95-69.16;
Eff. May 29, 1981;
Amended Eff. July 1, 2011; January 1, 2009; July 1, 2006; January 1, 1995; August 1, 1988;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0302 CERTIFICATE ISSUANCE

(a) The Chief Inspector shall issue an inspection certificate to the owner/user, upon receipt of payment, when the boiler or pressure vessel is found to be in compliance with this Chapter.

(b) The owner shall post the inspection certificate under protective cover in a prominent place visible to the operator while reading the pressure, or if a pressure gauge is not required to be installed, while observing operation of the boiler or pressure vessel, unless environmental conditions or proprietary reasons make it impracticable. The certificate shall be maintained in a readily retrievable location if the conditions make it impracticable to post.

(c) If the Chief Inspector determines that a boiler or pressure vessel is exposing the public to an unsafe condition likely to result in serious personal injury or property damage, the Chief Inspector may refuse to issue or renew or may revoke, suspend or amend an inspection certificate; provided, however, that whenever any action is taken under this Paragraph, the affected party shall be given notice of the availability of an administrative hearing and of judicial review in accordance with Chapter 150B of the N.C. General Statutes.

*History Note: Authority G.S. 95-69.11; 95-69.17;
Eff. May 29, 1981;
Amended Eff. January 1, 2009; July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0303 INSPECTIONS REVEALING DEFICIENCIES

(a) After a violation or deficiency has been reported by a Commissioned Inspector, the owner or user shall complete any required repairs or corrective action and request a reinspection or follow-up inspection as defined in this Chapter within 60 calendar days of the inspection, except in cases where the boiler or pressure vessel is removed from service, in which case the owner or user shall send in written confirmation, signed by the owner or user, that use of the boiler or pressure vessel has been discontinued and that the boiler or pressure vessel has been removed from the source of energy.

(b) Upon notification by the inspector of a boiler or pressure vessel for which continued operation creates a condition of imminent danger as defined in this Chapter, the Chief Inspector shall notify the owner or user by written notification within 15 calendar days stating that the use of the boiler or pressure vessel shall be discontinued.

(c) The owner or user may continue operation of the boiler or pressure vessel, including those boilers or pressure vessels that are condemned, during the 60 calendar day period noted in Paragraph (a) of this Rule, except that this provision shall not apply to boilers and pressure vessels after notification by the Chief Inspector to the owner or user that a condition of imminent danger exists as noted in Paragraph (b) of this Rule.

- (d) After completion of any required repairs or corrective action, the boiler or pressure vessel shall be reinspected to the extent necessary to verify satisfactory completion of the required repairs or corrective action.
- (e) An owner shall pay a fee of fifty dollars (\$50.00) to the North Carolina Department of Labor for each reinspection or follow-up inspection conducted by Deputy Inspectors.

History Note: Authority G.S. 95-69.11;
Eff. May 29, 1981;
Amended Eff. March 1, 2015; July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022.

13 NCAC 13 .0304 APPEALS

- (a) If the owner or user believes that the recommendations of the inspector are not warranted, he may request a review by the Chief Inspector within 15 days of the inspection. The Chief Inspector shall notify the owner or user of his decision in writing within 15 days of receipt of a request for a decision.
- (b) If the owner or user believes that the decision of the Chief Inspector is not warranted he may file for a contested case hearing pursuant to Article 3 of Chapter 150B of the N.C. General Statutes.
- (c) After verbal notification from the Chief Inspector that a condition of imminent danger exists, the owner or user shall not operate the boiler or pressure vessel, however, the owner or user may file for a contested case hearing pursuant to Article 3 of Chapter 150B of the N.C. General Statutes.

History Note: Authority G.S. 95-69.11; 95-69.17;
Eff. May 29, 1981;
Amended Eff. July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0305 MENACE TO PUBLIC SAFETY NOTICE

- (a) The Chief Inspector or his designee may post a menace to public safety notice on the boiler or pressure vessel:
- (1) if the owner or user fails to request a reinspection within 60 days of an inspection during which deficiencies were noted;
 - (2) upon verbal notification by the Chief Inspector regarding an inspection whereby the inspector identified a condition of imminent danger; or
 - (3) within 15 days after the Chief Inspector renders a decision regarding an appealed decision.
- (b) The notice described in this Rule shall be posted on the boiler or pressure vessel and in the establishment where the boiler or pressure vessel is being used so that it may be easily read by members of the public and employees.
- (c) The menace to public safety notice shall not be removed, rendered illegible or inaccessible, or otherwise obliterated except with the approval of the Chief Inspector.
- (d) The Chief Inspector shall notify the Commissioner of Labor regarding action pursuant to G.S. 95-69.19.

History Note: Authority G.S. 95-69.11; 95-69.17;
Eff. January 1, 1995;
Amended Eff. July 1, 2006;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0306 VIOLATIONS

- (a) Any person or legal entity operating a boiler or pressure vessel:
- (1) without an inspection certificate;
 - (2) after the inspection certificate has expired;
 - (3) while the inspection certificate is suspended;
 - (4) after the inspection certificate has been revoked and the boiler or pressure vessel has been condemned; or
 - (5) in excess of the maximum allowable working pressure as stated on the inspection certificate, or outside of the design pressure or temperature of the boiler or pressure vessel,

shall be subject to action as described in this Rule.

- (b) Action to be taken by the Chief Inspector may include any or a combination of the following actions:
- (1) injunctive proceedings instituted by the Commissioner pursuant to G.S. 95-69.11; or
 - (2) civil penalties issued by the Commissioner pursuant to G.S. 95-69.19.

*History Note: Authority G.S. 95-69.11; 95-69.14; 95-69.18;
Eff. May 29, 1981;
Recodified from 13 NCAC 13 .0305 Eff. January 1, 1995;
Amended Eff. July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

SECTION .0400 – GENERAL REQUIREMENTS

13 NCAC 13 .0401 DESIGN AND CONSTRUCTION STANDARDS

- (a) The design, construction, installation, inspection, stamping, certification, and operation of all boilers and pressure vessels shall conform to the rules in this Chapter and the Accepted Design and Construction Code as defined in this Chapter.
- (b) Repairs and alterations to boilers and pressure vessels shall conform to the requirements of the National Board Inspection Code, except as provided in Paragraph (g) of this Rule.
- (c) The rules of this Chapter shall control when any conflict is found to exist between the Rules and the accepted design and construction code or the National Board Inspection Code.
- (d) Welded repairs and alterations shall be made only by an individual or organization in possession of a valid certificate of authorization for use of the National Board "R" symbol stamp, except as provided in Paragraph (g) of this Rule. Repairs and alterations shall be reported on National Board "R1" and "R2" reports respectively, as required by the NBIC. These reports are available through the National Board of Boiler and Pressure Vessel Inspectors. The reports, along with supplements used, shall be submitted to the Chief Inspector within 60 days of the completion of the work conducted. Repair and alteration reports shall be annotated with the NC identification number for the pressure equipment repaired.
- (e) In such cases where removal of a defect in a pressure-retaining item is not practical at the time of discovery, the repair shall be conducted in compliance with the NBIC, Part 3 Repairs and Alterations, Repair of Pressure-Retaining Items Without Complete Removal of Defects. The Chief Inspector shall be contacted for approval of the use of this repair method.
- (f) Repairs of safety valves or safety relief valves shall be made by an individual or organization in possession of a valid certificate of authorization for use of the National Board "VR" symbol stamp.
- (g) Welded repairs and alterations to exhibition (historical) boilers of riveted or welded construction may be conducted by a welder who has been qualified in accordance with the ASME Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications.

*History Note: Authority G.S. 95-69.11;
Eff. May 29, 1981;
Amended Eff. October 1, 2014; July 1, 2011; January 1, 2009; July 1, 2006; January 1, 1995;
February 1, 1989; February 1, 1985; June 1, 1982;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022; January 1, 2020.*

13 NCAC 13 .0402 NORTH CAROLINA STAMPING AND REGISTRATION

- (a) Boilers and pressure vessels shall be registered with the National Board and shall bear the National Board stamping as follows:
- (1) high pressure boilers installed after November 2, 1946;
 - (2) heating boilers, except cast iron or cast aluminum boilers, installed after January 1, 1976;
 - (3) pressure vessels installed after January 1, 1979; and
 - (4) hydropneumatic storage tanks installed after January 1, 1986.
- (b) Boilers and pressure vessels may be exempted from the requirement for National Board registration provided the owner or user submits a letter requesting a variance to the Chief Inspector giving reason for the request. The

requestor shall enclose with the letter a copy of the original manufacturer's data report. The documentation shall be reviewed by the Chief Inspector to determine if the information is traceable to the boiler or pressure vessel. The owner or user shall be advised of the Chief Inspector's decision within 30 working days with regard to the approval or disapproval of the request.

(c) Electric boilers shall be listed in accordance with the North Carolina Building Code in effect at the time of installation.

(d) The owner or user shall, upon request of the inspector, provide a manufacturer's data report for the boiler or pressure vessel.

(e) When a new boiler or pressure vessel is installed, or when an existing installation receives its first certificate inspection, a Deputy Inspector shall conduct the first inspection and apply a metal tag embossed or stamped with the North Carolina identification number (e.g., NC000) to the boiler or pressure vessel on or adjacent to the manufacturer's nameplate or stamping. If the boiler or pressure vessel is constructed of materials having adequate thickness to allow stamping, the identification number may be stamped onto the boiler or pressure vessel.

(f) The owner or user shall keep all required stamping exposed at all times unless a labeled removable cover is installed so that the stamping may be accessible at any time.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. July 1, 2006; January 1, 1995; February 1, 1989; November 1, 1986;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022.*

13 NCAC 13 .0403 MAXIMUM ALLOWABLE WORKING PRESSURE

(a) An inspector may lower the maximum allowable working pressure of any boiler or pressure vessel because of age, condition or the circumstances under which it is operated.

(b) The inspector shall justify the reduction in the maximum allowable working pressure and note the new maximum allowable working pressure on the inspection report.

(c) No boiler or pressure vessel may be operated in excess of the maximum allowable working pressure as stated on the inspection certificate or outside of the temperature ranges for which the boiler or pressure vessel was designed.

(d) If a boiler or pressure vessel has its maximum allowable working pressure reduced under this chapter, the owner or user may appeal the inspector's decision to the Chief Inspector in accordance with the requirements of 13 NCAC 13 .0304.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. January 1, 2009; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0404 CONTROLS AND SAFETY DEVICES

Boilers and pressure vessels shall be equipped with all suitable controls and safety devices required for safe operation of the equipment. Controls and safety devices shown in Table-0404 in this Rule are considered minimum requirements for the various types of boilers and pressure vessels listed. All devices required in this Rule and shown in Table-0404 are suitable for the maximum allowable operating pressure and temperature of the boiler or pressure vessel on which they are installed. The design, construction, installation, and operational requirements for controls and safety devices are as required in Rules .0405 through .0420 of this Section.

TABLE-0404

REQUIRED DEVICE AND REFERENCED RULE	HIGH PRESSURE BOILER	STEAM HEATING BOILER	HOT WATER HEATING BOILER	HOT WATER SUPPLY BOILER	WATER HEATER	PRESSURE VESSEL
Pressure Relief Device .0405	X	X	X	X	X	X
High Limit Control .0406	X	X	X	X	X	
Pressure Gauge .0407	X	X	X	X		X

Steam Syphon (steam boilers only) .0407	X	X				
Water Column & Gauge Glass (steam boilers only) .0408	X	X				
Low-Water Fuel Cutoff (If input > 400,000 Btu) .0409	X	X	X	X		
Temperature Gauge .0410			X	X	X	
Bottom Blowoff Valves .0411	X	X				
Drain Valves .0411	X	X	X	X	X	X
Make-up Water Stop Valve(s) .0411	X	X	X	X	X	
Expansion Tank .0412			X	X	X	
Flame Failure Control .0420	X	X	X	X		

*History Note: Authority G.S. 95-69.11; 95-69.14;
 Eff. January 1, 1995;
 Amended Eff. July 1, 2011; January 1, 2009; July 1, 2006;
 Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0405 PRESSURE RELIEF DEVICES

- (a) Boilers and pressure vessels shall be protected from overpressurization by a pressure relief device. All pressure relief devices installed on any boiler or pressure vessel shall be constructed and stamped in accordance with the Accepted Design and Construction Code as defined in Rule .0101 of this Chapter.
- (b) All pressure relief devices shall be stamped and capacity certified by the manufacturer indicating compliance with the National Board. The stamping shall include the set pressure and the relieving capacity.
- (c) High pressure boilers with over 500 square feet of heating surface and electrically fired boilers having an input in excess of 1100 kW shall be provided with a minimum of two safety valves. For high pressure boilers with a combined bare tube and extended water-heating surface area exceeding 500 square feet, one safety valve is required if the design steam generating capacity of the boiler is less than 4,000 pounds of steam per hour.
- (d) Safety valves and safety relief valves for heating boilers shall have a seat diameter of not less than ½ inch, and not more than 4 ½ inches.
- (e) Pressure relief devices shall have a set pressure and relieving capacity in accordance with the requirements of the Accepted Design and Construction Code for the type of equipment on which the pressure relief device is installed. At least one pressure relief device shall have the set pressure set at not greater than the maximum allowable working pressure of the boiler or pressure vessel. The relieving capacity shall not be less than the minimum required relieving capacity indicated on the manufacturer's name plate or stamping, or as otherwise required by the Accepted Design and Construction Code. Safety relief valves installed on water heaters shall be of the combination temperature and pressure relieving type, or as permitted by the Accepted Design and Construction Code for modular water heaters.
- (f) All safety valves installed on high pressure boilers shall be installed on top of the boiler, or in the case of watertube boilers on top of the upper drum, with the spindle in the vertical position. All safety valves and safety relief valves installed on heating boilers shall be on top of the boiler or on an opening at the highest practicable part, as determined by industry standards, of the side of the boiler, but in no case shall the safety valve be installed below the normal operating level for a steam boiler. Safety valves and safety relief valves installed on hot water heating boilers, hot water supply boilers, and steam heating boilers shall be installed with the spindles mounted in the vertical position. Safety relief valves for water heaters may be installed with the spindles mounted in either the vertical or horizontal position. In no case may pressure relief devices be mounted on appurtenances, unless permitted by the Accepted Design and Construction Code for modular heaters.
- (g) The distance between the pressure relief device outlet nozzle on the boiler and the pressure relief device inlet shall be kept to a minimum consistent with the size of the pressure relief device and the pipe sizes required. In no case shall any valves or stops be installed in the inlet piping to the pressure relief device or in the discharge piping from the pressure relief device. The boiler outlet and the piping between the boiler outlet and the pressure relief device shall have a cross sectional area of not less than the cross sectional area of the pressure relief device inlet.
- (h) Discharge piping from the pressure relief device outlet shall be the same size, or larger, than the outlet pipe connection on the pressure relief device and shall be extended full size to a safe location. A safe location shall be

interpreted to mean a location within six inches of the finished floor of the mechanical room, to a location outside the building terminating a safe distance above the building roof or to a location outside the building within six inches above the finished grade. For vessels such as organic fluid heaters where the medium presents a hazard, the discharge shall be to a containment vessel large enough to hold all anticipated pressure relief discharges. When pressure relief device discharge piping is routed vertically, piped drainage shall be provided by the use of drip pan elbows installed on the outlet of each pressure relief device served.

(i) Multiple pressure relief devices may be piped to the point of discharge using a common discharge header pipe. The header pipe size shall have a diameter sufficient to provide an equivalent cross-sectional area equal to or larger than the sum of the cross-sectional areas of the pressure relief device outlets to which it is connected.

(j) Pressure relief devices on pressure vessels may be installed with the spindle in the vertical or horizontal position. The pressure relief device inlet, discharge piping, and the requirement for piping the discharge to a safe location shall be the same as noted for boilers. The requirement for discharge piping is optional for pressure vessels used to store compressed air, inert gasses, water, or other fluids no more hazardous than water.

(k) Pressure relief devices for direct fired pressure vessels and for those used as air compressor storage tanks shall be installed directly on the pressure vessel with no intervening valves. Pressure relief devices for all other pressure vessels may be installed directly on the pressure vessel or in the piping system.

(l) A stop valve may be installed between a pressure vessel and the pressure relief device if one of the following is satisfied:

- (1) the stop valve is normally locked in the open position, and may only be closed when there is an attendant stationed at all times at the stop valve when it is in the closed position for testing purposes; or
- (2) isolating the pressure relief device from the pressure vessel by closing the stop valve also isolates the pressure vessel from the source of pressure.

(m) Pressure relief devices shall be sealed to prevent the valve from being taken apart without breaking the seal. Pressure relief devices for boilers and pressure vessels containing air, water, or steam shall be provided with a test lever, pull test ring or other mechanism that may be used to test the operation of the valve. Pressure relief devices which are required to be provided with a testing mechanism shall be readily accessible for testing from the work platform or other means, such as a pull chain, shall be provided so that the pressure relief device can be tested from the work platform.

(n) When a hot water supply boiler or storage vessel is heated indirectly by steam or hot water in a coil or pipe, the pressure relief device capacity shall be determined by the heating surface available for heat transfer, and the pressure relief device shall not be less than 1 inch diameter.

(o) A person shall not:

- (1) attempt to remove, tamper, alter or conduct any work on any pressure relief device while the boiler or pressure vessel is in operation, except as permitted by the Accepted Design and Construction Code or the National Board Inspection Code;
- (2) load a pressure relief device in any manner to maintain a working pressure in excess of the maximum allowable working pressure as stated on the inspection certificate;
- (3) operate any boiler or pressure vessel without the safety appliances as described in this Chapter, the Accepted Design and Construction Code, and the National Board Inspection Code;
- (4) use a pressure relief device required by this Chapter as an operating pressure control; or
- (5) remove the seal and attempt to adjust or otherwise work on a pressure relief device unless the person or company removing the seal is an authorized holder of a National Board "VR" stamp.

(p) If an owner or user can demonstrate that a pressure vessel is operating in a system of such design that the maximum allowable working pressure cannot be exceeded, the Chief Inspector shall waive the requirement for installation of a pressure relief device if the pressure vessel meets the safety requirements greater than or equal to the level of protection afforded by this Chapter and the Accepted Design and Construction Code, and does not pose a danger to persons or property.

(q) Pressure relief device piping shall be supported so that the piping is supported with no additional force being applied to the pressure relief device.

(r) Hydropneumatic storage tanks shall be provided with a relief valve of not less than ¾ inch NPS and rated in standard cubic feet per minute (SCFM). The relief valve shall be installed on top of the tank. This rule applies to any equipment or relief valves installed after January 1, 2009.

(s) Dead weight safety valves are prohibited from use on any boiler or pressure vessel regulated by this Chapter.

(t) When the minimum safety valve relieving capacity is not found on the data plate, the table in this Paragraph may be used to determine the required safety valve capacity for steam boilers. The factor noted in the table shall be

multiplied by the heating surface of the boiler to determine required safety valve relieving capacity. When the table in this Paragraph is used for calculations, the additional requirements found in NBIC Part 4, Section 2 for calculating heating surface shall be utilized.

Table-0405 Guide for Estimating Steaming Capacity Based on Heating Surface		
	Firetube Boilers	Watertube Boilers
Boiler heating surface:		
Hand-fired	5	6
Stoker-fired	7	8
Oil, gas, or pulverized fuel	8	10
Waterwall heating surface:		
Hand-fired	8	8
Stoker-fired	10	12
Oil, gas, or pulverized fuel	14	16
Copper-finned watertube		
Hand-fired	N/A	4
Stoker-fired	N/A	5
Oil, gas, or pulverized fuel-fired	N/A	6

History Note: Authority G.S. 95-69.11; 95-69.14; Eff. May 29, 1981; Amended Eff. June 1, 1992; February 1, 1985; Recodified from 13 NCAC 13 .0404 Eff. January 1, 1995; Amended Eff. January 1, 2009; July 1, 2006; January 1, 1995; Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018; Amended Eff. April 1, 2022.

13 NCAC 13 .0406 HIGH PRESSURE OR TEMPERATURE LIMIT CONTROL

(a) Each automatically fired steam boiler or system of commonly connected steam boilers shall have at least one steam pressure control that shuts off the fuel supply to each boiler or system of commonly connected boilers when the pressure reaches a preset maximum operating pressure. In addition to the required operating pressure control, each individual automatically fired steam boiler shall have a high steam pressure limit control that shuts off the fuel supply to the boiler to prevent pressure in excess of the maximum allowable working pressure. The high limit control shall be equipped with a manual reset that shall prevent the boiler from being fired after the maximum pressure has been reached until the operator resets the switch manually. Steam boilers shall be provided with a syphons or equivalent that will provide a water seal and protect the pressure controls from being damaged by the steam.

(b) Each automatically fired hot water heating boiler, hot water supply boiler, water heater or each system of commonly connected hot water heating or supply boilers shall have at least one temperature-actuated control to shut off the fuel supply when the system water reaches a preset operating temperature. In addition to the required temperature control, each individual automatically fired hot water heating boiler, hot water supply boiler, and water heater shall have a high temperature limit control that prevents the water temperature from exceeding the maximum allowable temperature for the respective equipment. The high limit control for the hot water heating boilers and hot water supply boilers that are either stamped with the ASME "H" designator or are not constructed in accordance with the ASME Codes shall be equipped with a manual reset that shall prevent the boiler from being fired after the maximum temperature has been reached until the operator resets the switch manually. A manual reset is not required for boilers that bear the AMSE "HLW" designator or for unfired pressure vessels.

(c) Automatic resets or remote resets by electronic means are prohibited. The manual reset may be incorporated in the high limit control. Where the reset device is separate from the high limit control, a means shall be provided to indicate actuation of the high limit control. Each high limit and operating control shall have its own sensing element and operating switch.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Recodified from 13 NCAC 13 .0407 Eff. January 1, 1995;
Amended Eff. July 1, 2011; July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022.

13 NCAC 13 .0407 PRESSURE GAUGES

- (a) Boilers and pressure vessels, other than water heaters, shall be provided with a pressure indicating gauge which is visible to the operator on the floor or normal work platform.
- (b) Pressure gauges shall have a pressure range of not less than 1½ times the operating pressure, nor more than four times the operating pressure, except that steam heating boilers shall have an upper limit of not less than 30 psig nor more than 60 psig, and a dial travel of three inches between 0 psig and 30 psig.
- (c) Hot water storage vessels and expansion tanks in boiler systems need not be provided with a pressure gauge in addition to the gauge supplied on the boiler.
- (d) Steam boilers shall be provided with a syphon or equivalent which will provide a water seal and protect the gauge from being damaged by the steam.
- (e) Pressure vessels, other than those used as air compressor receiver tanks, may have a remotely located pressure indicating device or a system pressure monitoring device in lieu of a pressure gauge connected directly to the pressure vessel.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. January 1, 1995;
Amended Eff. July 1, 2006;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0408 GAUGE GLASSES AND WATER COLUMNS

- (a) Steam boilers, except for forced flow steam boilers and forced flow water boilers requiring forced circulation to prevent overheating of the tubes, shall be provided with a visible gauge glass which will allow the operator to observe the water level of the boiler. Boilers with a maximum allowable working pressure in excess of 400 psig shall have two gauge glasses. Two independent remote level indicators may be used, in accordance with the ASME Code, in lieu of one of the gauges. Gauge glasses and remote level indicators must be visible to the operator while reading the pressure at the boiler.
- (b) Gauge glasses shall be mounted directly on the boiler or on a water column. Gauge glasses shall be mounted so that the lowest visible part of the gauge glass is above the lowest permissible water level by at least 2 inches for high pressure boilers and 1 inch for steam heating boilers. Gauge glasses may be installed with stop cocks or valves to allow for gauge glass replacement during boiler operation. The connections from the boiler shall be not less than 3/4 inch NPS up to and including the isolation valves, and not less than 1/2 inch outside diameter tubing from the isolation valve to the gauge glass.
- (c) Gauge glasses shall be provided with a drain valve or cock and discharge outlet at the bottom-most connection of not less than 1/4 inch diameter. The discharge outlet shall be piped to a safe location to prevent injury to the operator while blowing down the gauge glass.
- (d) Water columns, chambers which moderate fluctuations in water elevations for determining the operating water level in a boiler, when used, shall be designed, constructed, and stamped as required by the ASME Code. The piping connections to the boiler shall be not less than 1 inch NPS for high pressure boilers or 3/4 inch NPS for heating boilers. If the water column is connected to the boiler by pipe fittings, no shut off valves of any type shall be placed in such pipe. A cross or equivalent fitting shall be placed at every right angle turn to facilitate cleaning. Water columns shall have a drain valve and discharge outlet of not less than 3/4 inch NPS.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. January 1, 1995;
Amended Eff. July 1, 2011; July 1, 2006;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0409 AUTOMATIC LOW-WATER FUEL CUTOFF CONTROLS AND WATER-FEEDING DEVICES

- (a) Each automatically fired steam or vapor boiler, except miniature boilers, shall meet the following criteria:
- (1) Have at least two automatic low-water fuel cutoff devices;
 - (2) One of the low-water fuel cutoff devices may also be used to regulate the normal water level;
 - (3) Each cutoff device shall be installed to prevent startup and to shut down the boiler fuel or energy supply automatically when the surface of the water falls to a level not lower than the lowest visible part of the gauge glass;
 - (4) One control shall be set to function ahead of the other. The lower fuel cutoff device shall be equipped with a manual reset which shall prevent the boiler from being fired after the low water limit has been reached until the operator resets the switch manually; and
 - (5) The low-water fuel cutoffs shall be attached to the boiler or to the water column with no stops or valves. For float type low-water fuel cutoffs installed external to the boiler, each device shall be installed in individual chambers which shall be attached to the boiler by separate pipe connections below the waterline. If the low-water fuel cutoff is connected to the boiler by pipe and fittings, no shut off valves of any type shall be placed in such pipe. A cross or equivalent fitting shall be placed at every right angle turn to facilitate cleaning. Piping from the boiler shall be not less than 1 inch NPS. Low-water fuel cutoff designs embodying a float and float bowl shall have a vertical straightaway valved drain pipe of not less than $\frac{3}{4}$ inch NPS 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.
- (b) Each automatically fired hot water heating boiler with heat input greater than 400,000 Btu/hr (117 kW) shall meet the following criteria:
- (1) Be protected by a low-water fuel cutoff intended for hot water service;
 - (2) The fuel cutoff device shall be installed to prevent startup and to shut down the boiler fuel or energy supply automatically when the surface of the water falls to a level not lower than the lowest safe permissible water level established by the boiler manufacturer;
 - (3) The fuel cutoff device shall be equipped with a manual reset that shall prevent the boiler from being fired after the lowest water level has been reached until the operator resets the switch manually;
 - (4) The low-water fuel cutoff installed in a hot water heating boiler system may be installed anywhere in the system above the lowest safe permissible water level established by the boiler manufacturer so long as there is no isolation valve installed between the device and the boiler. Connections to the system shall be not less than 1 inch NPS; and
 - (5) Testing the operation of the low-water fuel cutoff on a hot water heating boiler system shall be provided without resorting to draining the entire system.
- (c) Coil type boilers or watertube boilers requiring forced circulation to prevent overheating of the coils or tubes may have a flow-sensing device installed at or near the boiler proper, in lieu of a low-water fuel cutoff, to automatically cut off the fuel supply when the circulation of flow is interrupted. If there is a definitive water line, a low-water fuel cutoff complying with Paragraph (a) or (b) of this Rule, as applicable, shall be provided in addition to the flow-sensing device.
- (d) Electric boilers where uncovering of the electrical element can lead to a risk of damage to the boiler shall be equipped with a low-water fuel cutoff device. In the case of electrode type boilers, where the reduction in water level provides a self-limiting control on heat input, a low-water cutoff control is not required.
- (e) Automatically fired boilers shall be provided with a system to automatically maintain a constant water level so that the water level cannot fall below the lowest safe water line. This constant water level system requirement shall not apply to hot water heating boilers used in closed-loop radiant floor heating systems when installed in accordance with the manufacturer's instructions.
- (f) Low water fuel cutoff devices embodying a float and float bowl shall be installed so that the boiler feedwater or makeup water cannot be introduced through the float chamber.

*History Note: Authority G.S. 95-69.14;
 Eff. January 1, 1982;
 Recodified from 13 NCAC 13 .0416 Eff. January 1, 1995;
 Amended Eff. July 1, 2011; January 1, 2009; July 1, 2006; January 1, 1995;*

Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022.

13 NCAC 13 .0410 TEMPERATURE GAUGES/THERMOMETERS/TEMPERATURE SENSORS

(a) Every high temperature water boiler, hot water heating boiler, hot water supply boiler or water heater shall be provided with a temperature gauge, thermometer or temperature sensor with the display located and connected so that it is readable. The temperature gauge, thermometer or temperature sensor shall be located so that it indicates the temperature of the water in the boiler at or near the outlet at all times.

(b) Temperature gauges and thermometers shall have a range of approximately two times the intended operating temperature. The temperature gauge shall have a range of no less than one and a half times and no more than four times the intended operating temperature.

(c) Electronic temperature sensors may be used in lieu of temperature gauges and thermometers and shall meet the following requirements:

- (1) The sensor shall be powered from the boiler power supply, have a backup power supply, and have a display that remains on at all times;
- (2) The full scale of the sensor and display shall be at least 250 degrees Fahrenheit, and shall be accurate to within +/- one degree;
- (3) The sensor shall have a minimum operating temperature range of 32 degrees Fahrenheit to 300 degrees Fahrenheit; and
- (4) The display shall have an ambient operating temperature range of 32 degrees Fahrenheit to 120 degrees Fahrenheit, unless otherwise required by the application.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. January 1, 1982;
Recodified from 13 NCAC 13 .0411 Eff. January 1, 1995;
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Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0411 VALVES, DRAINS, AND BOTTOM BLOWOFFS

(a) High pressure boilers operating in excess of 100 psig must be provided with two stop valves for boiler blowoff and drain outlets. Any boiler having a common steam connection with another boiler, and having a manhole opening, shall be provided with two steam outlet stop valves with an ample free-blow drain or vent between the two stop valves. The discharge of this drain shall be visible to the operator while operating the valve.

(b) All boilers, except for coil-type water tube boilers, shall be provided with a drain outlet and stop valve of not less than 3/4 inch NPS at the lowest water containing space, except that if the boiler is provided with a blowoff outlet at the lowest water containing space, an additional drain outlet is not required.

(c) High pressure boilers shall be provided with a bottom blowoff outlet and valve of not less than 1 inch NPS nor more than 2 1/2 inches NPS, except as modified below:

- (1) Miniature high pressure boilers shall have a blowoff outlet of not less than 3/4 inch NPS;
- (2) Electric high pressure boilers not greater than 200kW shall have a blowoff outlet of not less than 3/4 inch NPS;
- (3) High pressure boilers having a heating surface not greater than 100 square feet shall have a blowoff outlet of not less than 3/4 inch NPS; and
- (4) All other high pressure boilers shall have a blowoff outlet of not less than 1 inch NPS.

(d) Steam heating boilers shall be provided with a bottom blowoff outlet and valve of not less than 1 inch NPS nor more than 2 1/2 inches NPS, except as modified below:

- (1) Steam heating boilers having a minimum safety valve relieving capacity not exceeding 500 pounds of steam per hour shall have a blowoff outlet of not less than 3/4 inch NPS;
- (2) Steam heating boilers having a minimum safety valve relieving capacity greater than 1205 pounds of steam per hour but not greater than 2500 pounds of steam per hour shall have a blowoff outlet of not less than 1 1/4 inches NPS;

- (3) Steam heating boilers having a minimum safety valve relieving capacity greater than 2500 pounds of steam per hour but not greater than 6000 pounds of steam per hour shall have a blowoff outlet of not less than 1 1/2 inches NPS;
 - (4) Steam heating boilers having a minimum safety valve relieving capacity greater than 6000 pounds of steam per hour shall have a blowoff outlet of not less than 2 inches NPS; and
 - (5) All other steam heating boilers shall have a blowoff outlet of not less than 1 inch NPS.
- (e) All blowoff from boilers shall discharge into a blowdown tank suitable for separating steam and water or shall be piped to prevent injury. Discharge directly to a sewer is prohibited.
- (f) Valves for high pressure boilers shall be designed and constructed in accordance with the requirements of ASME Section I, and shall be stamped or embossed with the pressure/temperature rating of the valve.
- (g) Valves for heating boilers shall be suitable for the operating pressure and temperature of the boiler.
- (h) Pressure reducing valves shall be installed in the makeup water line where inlet supply water pressure is more than 75 percent of the maximum allowable working pressure of the boiler or pressure vessel.
- (i) A shutoff valve shall be provided in the makeup water line next to each boiler and shall meet the following specifications:
- (1) Each steam heating boiler and hot water heating boiler shall be provided with a shutoff valve and a check valve. The shutoff valve shall be installed either upstream or downstream of the check valve;
 - (2) Each high pressure boiler, except for high temperature water boilers, shall be provided with a shutoff valve and a check valve. The shutoff valve shall be installed between the check valve and the boiler; and
 - (3) When two or more high pressure boilers are fed from a common source, there shall also be a globe or regulating valve in the branch to each boiler located between the check valve and the source of the supply.
- (j) Pressure vessels subject to corrosion shall be equipped with a drain valve installed at the lowest point of the pressure vessel or by installation of an internal drain pipe installed not more than 1/4 inch above the lowest internal surface.

*History Note: Authority G.S. 95-69.11; 95-69.14;
 Eff. January 1, 1995;
 Amended Eff. July 1, 2011; July 1, 2006;
 Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0412 EXPANSION TANKS

- (a) Hot water heating systems shall allow for thermal expansion and contraction of the piping to prevent excessive stress from being introduced into the pipe or connected equipment.
- (b) When new equipment is installed and a backflow prevention system is installed or already exists on a potable water supply line for a hot water supply boiler or water heater, expansion tanks shall be installed. For water heaters, backflow preventers or check valves may be installed at the meter in water systems.
- (c) When expansion tanks are used they shall be constructed and stamped in accordance with the requirements of this Chapter for pressure vessels, unless exempted due to the vessel size or operating limits.
- (d) For a closed type system the expansion tank shall be not less than that determined as follows:
 - $V_t = [(0.00041T - 0.0466)V_s] / [(P_a/P_f) - (P_a/P_o)]$ where:
 - V_t = minimum volume of tank(s), gal
 - V_s = volume of system, not including tanks, gal
 - T = average operating temperature, deg F
 - P_a = atmospheric pressure, psi
 - P_f = fill pressure, psi
 - P_o = maximum operating pressure, psi.

*History Note: Authority G.S. 95-69.11; 95-69.14;
 Eff. May 29, 1981;
 Recodified from 13 NCAC 13 .0410 Eff. January 1, 1995;
 Amended Eff. July 1, 2011; January 1, 2009; January 1, 1995;*

Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0413 CLEARANCES

(a) All boilers and pressure vessels shall be located so that adequate space is provided for proper operation, including visibility of all gauges, for the inspection of all surfaces, tubes, waterwalls, economizers, piping, valves and other equipment, and for maintenance and repair, including replacement of tubes. Boiler clearances shall remain free of all items, including temporarily stored items, other than boiler piping and trim. Boiler piping and trim shall not impede access to the boiler.

(b) Adequate clearance for boilers and pressure vessels installed prior to January 1, 2009 shall not be less than the following:

- (1) Three feet of clearance shall be provided between the boiler or pressure vessel on all service sides, and clearances as recommended by the manufacturer on all other sides. Service side shall be interpreted as any side, including the top, of a boiler or pressure vessel on which clearance is necessary to access operating controls, safety devices, drain and blowoff valves, or inspection openings.
- (2) Cabinet mounted boilers, such as those used primarily for process or cooking, and having a maximum input of 400,000 Btu/hr need only be provided with the unobstructed clearances recommended by the manufacturer.

(c) Adequate clearance for boilers and pressure vessels installed after January 1, 2009 shall not be less than the following:

- (1) High-pressure steam boilers that exceed 5,000,000 Btu/hr input (1465 kW), 5,000 pounds of steam per hour capacity or a 1,000-square-foot heating surface shall have a minimum unobstructed clearance of seven feet from the top of the boiler to the ceiling.
- (2) The following types of boilers and pressure vessels shall have a minimum unobstructed clearance of three feet from the top of the boiler to the ceiling:
 - (A) Steam-heating boilers and hot-water-heating boilers that exceed 5,000,000 Btu/hr input (1465 kW), 5,000 pounds of steam per hour capacity or a 1,000-square-foot heating surface;
 - (B) High-pressure steam boilers that do not exceed 5,000,000 Btu/hr input (1465 kW), 5,000 pounds of steam per hour capacity or a 1,000-square-foot heating surface; and
 - (C) All boilers with manholes on top of the boiler.
- (3) Package boilers, steam-heating boilers and hot-water-heating boilers without manholes on top of the shell that do not exceed 5,000,000 Btu/hr input (1465 kW), 5,000 pounds of steam per hour capacity or a 1,000-square-foot heating surface shall have a minimum unobstructed clearance of two feet from the ceiling.

(d) When boilers or pressure vessels are installed or replaced, unobstructed clearance shall be provided to allow access for inspection, maintenance and repair. Passageways around all sides of boilers and pressure vessels shall have an unobstructed width of not less than 18 inches, unless otherwise recommended by manufacturer's installation instructions.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Recodified from 13 NCAC 13 .0409 Eff. January 1, 1995;
Amended Eff. February 1, 2009; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0414 GAS-FIRED JACKETED STEAM KETTLE

Gas-fired jacketed steam kettles having a steam space of such size that they are subject to the rules in this Chapter shall be equipped with the operating controls and safety devices required for boilers, except that only one low water fuel cutoff control is required.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. January 1, 2009; July 1, 2006; January 1, 1995;*

Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0415 AGE LIMIT FOR CERTAIN BOILERS AND PRESSURE VESSELS

(a) Except as provided in Paragraph (b) of this Rule, a boiler or pressure vessel shall not be operated for longer than 20 years from the date of its installation if it is not constructed according to the ASME Code and has riveted longitudinal lap joints.

(b) The Chief Inspector may authorize operation of a boiler or pressure vessel meeting the criteria listed in Paragraph (a) of this Rule after the owner or user satisfactorily completes such additional examinations, tests, and engineering evaluations as may be deemed necessary by the Chief Inspector, to demonstrate that the boiler or pressure vessel is suitable for operation at the maximum allowable working pressure for the term of the inspection certificate.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Recodified From 13 NCAC 13 .0405 Eff. January 1, 1995;
Amended Eff. July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0416 REINSTALLATION OF CERTAIN BOILERS AND PRESSURE VESSELS

(a) A boiler or pressure vessel that is not constructed pursuant to the accepted design and construction code shall not be reinstalled at any location in this State when the reinstallation is accompanied by a change of ownership of the boiler or pressure vessel unless the owner/user receives authorization in writing from the Chief Inspector.

(b) Used boilers or pressure vessels shall not be installed unless an application for permission to install the equipment has been approved in writing according to the rules in this Chapter by the Chief Inspector followed by a certificate inspection by a Deputy Inspector.

(c) Applications to install used or nonstandard boilers or pressure vessels must be made in writing to the Chief Inspector.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Recodified from 13 NCAC 13 .0406 Eff. January 1, 1995;
Amended Eff. January 1, 2009; July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0417 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 and distribute the weight contained thereon. There shall be no excessive vibration in the boiler, pressure vessel, or connected piping or fittings.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Recodified from 13 NCAC 13 .0408 Eff. January 1, 1995;
Amended Eff. January 1, 2009;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0418 VENTING OF NON-PRESSURIZED CONDENSATE RECEIVERS

Two means of venting shall be provided on any condensate receiver tank equipped with an internal float. The tank shall have two separate connections, one to be used as a vent and one as an overflow, and shall be so piped.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Recodified from 13 NCAC 13 .0412 Eff. January 1, 1995;*

Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0419 AIR AND VENTILATION REQUIREMENTS

- (a) Unobstructed air openings shall be sized on the basis of 1 sq. in. (650 sq. mm) free area per 2000 Btu/hr. maximum fuel input of the combined burners located in the boiler room, or as specified in the National Fire Protection Association (NFPA) standards for oil and gas burning installations for the particular job conditions. The boiler room air supply openings shall be kept clear at all times.
- (b) Power ventilators or fans shall be sized on the basis of 0.2 cfm (0.0057 cubic meters per minute) for each 1000 Btu/hr. of maximum fuel input for the combined burners of all boilers and water heaters located in the boiler room.
- (c) When power ventilators or fans are used to supply combustion air they shall be installed with interlock devices so that the burners will not operate without an adequate number of ventilators/fans in operation.
- (d) Oil, gas and solid fuel fired boilers and pressure vessels shall be equipped with exhaust flues, stacks, or chimneys discharging to a safe point outside of the building.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. January 1, 1982;
Recodified from 13 NCAC 13 .0413 Eff. January 1, 1995;
Amended Eff. July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0420 FIRING MECHANISM CONTROLS

- (a) Automatically fired boilers and pressure vessels shall be provided with firing mechanism controls.
- (b) Oil, gas-fired, and electrically heated boilers shall be equipped with primary flame safeguard safety controls, safety limit switches, and burners or electric elements that conform to the North Carolina Building Code in effect at the time of installation.
- (c) Automatically fired boilers installed after January 1, 2007, shall be provided with a remote emergency fuel shut-off switch marked for identification. The remote shut-off switch shall be located outside each door of the room in which the boiler is located. Alternatively, the shut-off switch may be located just inside the entrance door(s) where the equipment is located. If there is more than one door to the boiler room, there shall be a switch located at each door designed for primary emergency egress from the boiler room. Boilers that bear the ASME "HLW" designator are not required to be provided with a remote emergency fuel shut-off switch.

*History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. January 1, 1995;
Amended Eff. February 1, 2009; July 1, 2006;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended April 1, 2022.*

13 NCAC 13 .0421 NORTH CAROLINA SPECIAL

- (a) The North Carolina Department of Labor may issue an inspection certificate for a boiler or pressure vessel constructed under standards equivalent to those established in the ASME Code if an application for permission to construct and install a North Carolina Special is submitted to and approved by the Chief Inspector prior to commencing construction. The Chief Inspector may approve a request for an inspection certificate if the application is complete and if the information contained in the application demonstrates that the boiler or pressure vessel is as safe as a similar boiler or pressure vessel constructed to the requirements of the ASME Code. The application, which may be in the form of a letter, shall contain relevant data proving that its construction is equivalent to ASME standards. The Chief Inspector or his designee may elect to visit, at the expense of the owner, user or manufacturer, the facility where the boiler or pressure vessel is under construction in order to audit the manufacturer's construction techniques, personnel qualifications, and quality control program.
- (b) The North Carolina Department of Labor may issue an inspection certificate for a boiler or pressure vessel which has operated in another state even if the ASME construction and stamping requirements otherwise contained in the North Carolina Rules are not satisfied if the following requirements are satisfied:

- (1) the state in which the boiler or pressure vessel was operated enforces ASME Code requirements for similar boilers and pressure vessels;
 - (2) the boiler or pressure vessel was inspected during construction by an inspector commissioned by the state in which the item was installed or manufactured; and
 - (3) the report from the last certificate inspection conducted in the state in which the boiler or pressure vessel was previously installed is made available to the Chief Inspector, and the inspection resulted in the applicable authorization for operation.
- (c) The applicant shall submit a design specification, certified by a professional engineer, to the Chief Inspector to verify that the boiler or pressure vessel meets the ASME Code as far as is practicable. The following documentation shall be included as a minimum:
- (1) design calculations and drawings;
 - (2) material test reports or their equivalent, and for material not allowed by ASME, an evaluation of the materials in comparison to the most similar material approved for ASME construction;
 - (3) a record of welding qualifications as required by Section IX of the ASME Welding and Brazing Qualifications Code; and
 - (4) satisfactory results of any additional examination or test deemed necessary by the Chief Inspector.
- (d) Design calculations for pressure vessels to be operated in excess of 3,000 psig shall include a fatigue analysis as described in ASME Section VIII, Division 2 or 3, to determine the operating lifetime of the pressure vessel, and a proposal for operation that details the owner's monitoring program to verify compliance with the fatigue analysis.
- (e) The maximum allowable working pressure for the boiler or pressure vessel as established in the calculations shall be consistent with what is required by the ASME Code for similar boilers or pressure vessels.
- (f) Boilers and pressure vessels operating as North Carolina State Specials shall meet all installation, alteration, inspection, repair, and operation requirements of this Chapter.
- (g) The Chief Inspector may approve operation of boilers and pressure vessels which were constructed to the requirements of a department of the federal government which enforces requirements equivalent to the ASME Code, provided an application as otherwise required by this Chapter is submitted to the Chief Inspector and found acceptable.

*History Note: Authority G.S. 95-69.11; 95-69.14;
 Eff. May 29, 1981;
 Amended Eff. March 2, 1992;
 Recodified from 13 NCAC 13 .0415 Eff. January 1, 1995;
 Amended Eff. July 1, 2006; January 1, 1995;
 Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.*

13 NCAC 13 .0422 EXHIBITION BOILERS

Exhibition boilers shall meet the following requirements:

- (1) Exhibition boilers that are not built to the ASME Code shall not be operated above 125 psig without written approval by the Chief Inspector, who shall base such approval on documentation and calculations submitted by the owner. The documents and calculations, with an inspection, must provide evidence to support the exhibition boiler operating at higher pressure ratings.
- (2) Safety relief valves shall not exceed the maximum allowed working pressure of the boiler and shall be ASME/NB certified valves.
- (3) Each boiler shall have:
 - (a) an operating pressure gauge which shall be approximately double the pressure to which the safety relief valve is set but in no case shall it be less than 1 1/2 times the set pressure;
 - (b) a safety relief valve which shall be capable of protecting the boiler from over pressurization; and
 - (c) a water gauge glass.
- (4) When fusible plugs are used, they shall conform to NBIC Part 2 as applicable.
- (5) A hydrostatic test may be required by the inspector if it is necessary to prove the integrity of the pressure boundary. The hydrostatic test shall not exceed 125 percent of the maximum allowed working pressure of the vessel or the set pressure of the safety valve, whichever is greater.
- (6) Upon completion of the inspection and payment of the applicable fees referenced in this Chapter, the Chief Inspector shall issue a Certificate of Inspection valid for one year.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. July 1, 2006;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022.

13 NCAC 13 .0423 MODEL HOBBY BOILERS

Model hobby boilers shall meet the following requirements:

- (1) Each boiler shall have:
 - (a) an operating pressure gauge that shall not be less than 1 ½ times nor more than four times the operating pressure of the boiler;
 - (b) two safety relief valves each of which shall be capable of protecting the boiler from over pressurization. Requirements for ASME/NB certification are waived. If an ASME/NB safety relief valve is utilized, only one safety relief valve is required;
 - (c) an accessible mud-ring valve;
 - (d) a water gauge glass; and
 - (e) if constructed of copper, a fusible plug in the top of the crown sheet.
- (2) Upon completion of the inspection and payment of the applicable fees referenced in this Chapter, the Chief Inspector shall issue a Certificate of Inspection valid for one year.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. July 1, 2006;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended April 1, 2022.

SECTION .0500 - NON-STANDARD BOILERS AND PRESSURE VESSELS

13 NCAC 13 .0501 GENERAL REQUIREMENTS

- (a) All aspects of a nonstandard boiler or pressure vessel including, but not limited to, its installation, repair, alteration, inspection, appurtenances, and operation shall conform to the ASME Code and the National Board Inspection Code and the Rules in this Chapter, except for the design criteria for the boiler or pressure vessel proper and pressure piping.
- (b) Replacement parts for the boiler or pressure vessel shall conform to the ASME Code and the Rules in this Chapter.
- (c) An inspector shall determine the maximum allowable working pressure for a nonstandard boiler or pressure vessel in accordance with the Rules in this Chapter.
- (d) The maximum allowable working pressure on the shell of a nonstandard boiler or pressure vessel shall be determined by the strength of the weakest course computed from the thickness of the plate, the tensile strength of the material, the efficiency of the longitudinal joint, inside diameter of the weakest course and the factor of safety set by the Rules in this Chapter.
- (e) For cylindrical pressure parts subject to internal pressure:
 $(TStE)/(RFS) = \text{maximum allowable working pressure, psig.}$

(f) Design variables:

- (1) TS = ultimate tensile strength of shell plate; if unknown, it shall be taken as 45,000 psi;
- (2) t = minimum thickness of shell plate of weakest course, in inches;
- (3) E = efficiency of longitudinal joint depending upon construction;
 - (A) values for riveted joints are determined by calculated riveted efficiency; and
 - (B) values for fusion welded joints and riveted joints are determined pursuant to the following table:

WELD JOINT DESIGN	EFFICIENCY
Single lap weld	0.40
Double lap weld	0.50
Single butt weld	0.60

Double butt weld 0.75

RIVETED JOINT DESIGN	EFFICIENCY
Single lap	0.58
Double lap	0.74
Double butt and strap	0.82
Triple butt and strap	0.84
Quadruple butt and strap	0.94

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

(5) FS = factor of safety allowed by the Rules in this Chapter.

(g) The maximum allowable working pressure for cylindrical nonstandard boilers and pressure vessels subject to external pressure, flat or formed heads, and non-circular boilers and pressure vessels shall be determined by the most applicable rules for new construction in the ASME Code.

(h) The maximum allowable working pressure for cast iron boilers, including boilers having cast iron shells or heads and steel or wrought iron tubes, shall be not greater than 30 psig for water service and 15 psig for steam service.

(i) Replacement parts, repair, and alteration of nonstandard boilers and pressure vessels shall be as required for ASME stamped boilers and pressure vessels of similar design.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. July 1, 2006; January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0502 NONSTANDARD HEATING BOILERS
13 NCAC 13 .0503 NONSTANDARD PRESSURE VESSELS

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Repealed Eff. January 1, 1995.

13 NCAC 13 .0504 FACTORS OF SAFETY

(a) For nonstandard boilers, the factor of safety is four and one-half, except for horizontal-return tubular boilers having continuous longitudinal lap seams more than twelve feet in length, where the factor of safety is eight. When this latter type of boiler is removed from its existing setting, it shall not be reinstalled for pressure in excess of fifteen psig.

(b) The factor of safety for nonstandard boilers with lap-riveted longitudinal seams less than twelve feet in length is six.

(c) The factor of safety for a nonstandard boiler with butt and double-strap longitudinal seams is five.

(d) For nonstandard pressure vessels, the factor of safety is four, except that for non-ASME Code constructed hydropneumatic storage tanks containing water under pressure at ambient temperatures the factor of safety is two.

History Note: Authority G.S. 95-69.11; 95-69.14;
Temporary Amendment [(e) Eff. March 10, 1982, for a Period of 120 Days to Expire on July 8, 1982;
Eff. May 29, 1981;
Amended Eff. June 1, 1982;
Readopted [(e) Eff. January 1, 1986];
Amended Eff. January 1, 1995;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

SECTION .0600 - HOT WATER VESSELS USED FOR HEATING OR FOR STORAGE OF HOT WATER

13 NCAC 13 .0601	MINIMUM STANDARDS
13 NCAC 13 .0602	DISCHARGE LINES
13 NCAC 13 .0603	VESSELS HEATED INDIRECTLY BY STEAM OR WATER
13 NCAC 13 .0604	PROHIBITION AGAINST USE
13 NCAC 13 .0605	VENT PIPES
13 NCAC 13 .0606	HEAT SOURCE STANDARDS
13 NCAC 13 .0607	ACCESS TO THE VESSEL
13 NCAC 13 .0608	PRESSURE-REDUCING VALVES IN CITY LINES
13 NCAC 13 .0609	SHUTOFF VALVES

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. February 1, 1985; January 1, 1982;
Repealed Eff. January 1, 1995.

SECTION .0700 - NUCLEAR POWER SYSTEMS

13 NCAC 13 .0701 STANDARDS

- (a) Nuclear power components and systems covered under the scope of Section III of the ASME Code shall be designed, constructed, reworked, stamped, and installed in accordance with Section III of the ASME Code. Balance of plant items may be constructed under other applicable ASME Code sections.
- (b) All nuclear power systems falling under the scope of the ASME Code, Section III, are inspected in service under the requirements of Section XI of the ASME Code. The equipment is not required to be inspected under this Chapter. Balance of plant pressure equipment not covered by Section XI are required to be registered with a North Carolina identification number and inspected in accordance with this Chapter.
- (c) A vessel composed of two or more pressure retaining compartments shall constitute one complete unit for the purpose of assigning the North Carolina identification number.
- (d) The design criteria for nuclear power systems shall be certified as to compliance with Section III of the ASME Code.

History Note: Authority G.S. 95-69.9; 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. October 1, 2008; July 1, 2006; June 1, 1982;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018;
Amended Eff. April 1, 2022.

13 NCAC 13 .0702 INSPECTION DURING CONSTRUCTION

The constructor of a nuclear power plant shall have a contract with an Authorized Inspection Agency who will be responsible for ASME Code, Section III third party code inspections. It is the duty of the Authorized Nuclear Inspector (ANI) to conduct all of the inspections specified by the rules of the ASME Code, Section III and ASME QAI-1, in addition to such other inspections and tests as in his judgment are necessary to verify that the equipment is fabricated and installed in accordance with requirements of the ASME Code and these Rules.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. July 1, 2006;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0703 INSERVICE INSPECTION

The owner/operator of an operating nuclear power plant shall have a contract with an Authorized Inspection Agency who will be responsible for ASME Code, Section III and Section XI third party code inspections. It is the duty of the

ANI and Authorized Nuclear In-service Inspector (ANII), as applicable, to make all of the inspections specified by the rules of the ASME Code, Section III, Section XI and ASME QAI-1, and any other inspections and tests necessary to verify that the equipment is inspected, examined, repaired or replaced in accordance with requirements of the ASME Code.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. July 1, 2006;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0704 INSPECTOR QUALIFICATIONS

History Note: Authority G.S. 95-69.11; 95-69.14; 95-69.15;
Eff. May 29, 1981;
Repealed Eff. July 1, 2006.

13 NCAC 13 .0705 SEMI-ANNUAL AUDIT OF NUCLEAR INSPECTORS

The Authorized Inspection Agency shall maintain qualified Authorized Nuclear Supervisors (ANIS) to monitor the performance of the ANI and ANII and to audit the activities at the nuclear power plants for which inspection agreements have been made. The ANIS shall conduct audits of all the aspects of a ANI and ANII activities at the nuclear power plant.

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Amended Eff. July 1, 2006;
Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. July 22, 2018.

13 NCAC 13 .0706 CONSTRUCTION

History Note: Authority G.S. 95-69.11; 95-69.14;
Eff. May 29, 1981;
Repealed Eff. July 1, 2006.

SECTION .0800 - FORMS

13 NCAC 13 .0801	INSPECTION CERTIFICATE
13 NCAC 13 .0802	APPLICATION FOR A NORTH CAROLINA COMMISSION
13 NCAC 13 .0803	NORTH CAROLINA CERTIFICATE OF COMPETENCY
13 NCAC 13 .0804	NORTH CAROLINA COMMISSION
13 NCAC 13 .0805	OWNER-USER AGENCY APPLICATIONS
13 NCAC 13 .0806	OWNER-USER INSPECTION AGENCY STATEMENTS
13 NCAC 13 .0807	INSPECTION REQUEST
13 NCAC 13 .0808	INCIDENT REPORT
13 NCAC 13 .0809	INSPECTION REPORT

History Note: Authority G.S. 95-69.11; 95-69.13; 95-69.14; 95-69.15;
Eff. May 29, 1981;
Amended Eff. January 1, 1995; June 1, 1982;
Repealed Eff. July 1, 2006.

13 NCAC 13 .0810 REINSPECTION REPORT

History Note: Authority G.S. 95-69.11;
Eff. May 29, 1981;

