Adminstrative Code 1353 Boiler Safety

Regulations For Boilers, Pressure Vessels, and Nuclear Installations

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Note: Changes to the Rules and Regulations shall be made in accordance with the Administrative Procedures Act. (Chapter 101 Delaware Annotated Code)

Administrative Procedures
Statutory Authority: Title 7 Del. C. § 74B

1.0 Definitions

"The Act": Title 7 Del C. §74B.

Accident: An unexpected event resulting from (a) unknown causes, (b) carelessness, (c) unawareness, causing injury, death or property damage.

Alteration: Any change in the item described on the original Manufacturers' Data Report which affects the pressure containing capability of the pressure retaining item. Non-physical changes such as an increase in the maximum allowable working pressure (internal or external), increase in design temperature, or a reduction in minimum temperature of a pressure retaining item shall be considered an alteration. ASME: American Society of Mechanical Engineers.

ANSI: American National Standards Institute.

AIA: Authorized Inspection Agency as defined in NBIC.

AI: Authorized Inspector includes the Chief Inspector, a Deputy Inspector or Special Inspector holding a current National Board Commission, with an "A" or "B" endorsement, and a Delaware Certificate of Competency.

Antique Boiler: Boilers manufactured prior to January 1, 1924, and used solely for display and demonstration purposes.

APA: Administrative Procedures Act.

Authorized Inspection Agency:
New Construction: An Authorized Inspection Agency is one that is accredited by the National Board meeting the qualification and duties of NB-360, *Criteria for Acceptance of Authorized Inspection Agencies for New Construction.*

In-service: An Authorized Inspection Agency is either:

a) a jurisdictional authority as defined in the National Board Constitution; or
b) an entity that is accredited by the National Board meeting NB 369, *Qualifications and Duties for Authorized Inspection Agencies Performing In-service Inspection Activities and Qualifications for Inspectors of Boilers and Pressure Vessels;* N B-3 71, *Accreditation of Owner-User Inspection Organizations (OUIO)* or NB-390, For *Federal Inspection Agencies (FIAs) Performing In-service Inspection Activities.*

Automatically Fired Boiler: A boiler that cycles automatically in response to a control system with no operator.

Boiler: A closed vessel in which water is heated, steam is generated, steam is superheated, or any combination thereof, under pressure or vacuum for use externally to itself by the direct application of heat from the combustion of fuels, or from electricity or nuclear energy. The term "boiler" shall include fired units for heating or vaporizing liquids other than water, where these units are separate from processing systems, and are complete within themselves.

- Power boiler: A vessel in which steam or other vapor is generated at a pressure of more than fifteen (15) PSIG.
- High temperature water boiler: A water boiler operating at a pressure exceeding 160 psi and/or temperatures in excess of 250 degrees F.
- Thermal Fluid Heater::A boiler used to heat an organic fluid for heating and or processing that does not vaporize in the process. Object is considered a boiler in the State of Delaware and is required to be built to Section I of the ASME Construction Codes and registered with the National Board. Overpressure protection will be in accordance with ASME Section I Part PVG.

- Heating boiler: A steam boiler operating at pressures not exceeding fifteen 15 psi, or a hot water boiler operating at pressures not exceeding 160 psi and/or temperatures not exceeding 250 degrees F, which is supplied to an external heating system.
- Hot Water Supply Boiler: A vessel used to heat water for purposes other than space heating, where the water is used external to itself, at pressures not exceeding 160 psi, and/or temperatures not exceeding 250 degrees F. at or near the boiler outlet. ASME Stamping would be ASME Section IV, H.
- Pool Heater: An appliance designed for heating non-potable water stored at atmospheric pressure such as water in swimming pools, spas, hot tubs, and similar applications.
- Water Heater: A closed vessel in which water is heated by gas, oil, electric, or some other fuel supply, and the water is used externally to itself for potable water supply, or used for potable water and space heating (as outlined in Section 14 of these Rules and Regulations), operating at pressures not exceeding 160 psi and water temperatures not in excess of 210 degrees F. ASME Stamping would be ASME Section IV, HLW.
- *Jacketed Cooking Kettle: A gas or electrically fired jacketed cooking kettle built* and stamped ASME Section VIII, Division 1. ASME stamping would be U.

Certificate of Competency: A certificate issued by the Boiler Safety Program to an inspector after passing the Delaware test for inservice inspections, or to an inspector holding a valid National Board Commission for"New Construction Inspector". See Delaware Commission.

Certificate of Inspection: A printed document, issued by the Boiler Safety Program, signifying the object has met Code requirements after receipt of a report from a National Board Commissioned or Owner/User Inspector, stating the conditions of the object are satisfactory to issue a certificate. The inspector will issue a current decal bearing a date of inspection. The certificate becomes valid upon payment of the required inspection and/or certificate fees.

Chief Inspector: A State of Delaware Employee who is commissioned by the National Board responsible for code enforcement and jurisdictional interpretations.

Commission:

- National Board Commission - a certificate issued by the National Board to an individual that has taken and passed the National Board Commission examination
- Delaware Commission –
  - ***a.*** a Certificate of Competency issued by the Boiler Safety Program to a National Board Commissioned Inspector employed by the State of Delaware;
  - ***b.*** by an insurance company licensed to sell boiler and machinery insurance in the State of Delaware;
  - c. or an owner/user inspector employed by a recognized Delaware Owner/User Agency.

Council: Refers to the members of the Governor's "Council on Boiler Safety". Title 7 Delaware Code Chapter 74B..

Controls and Safety Devices (CSD-1): ASME Standard adopted by the Boiler Safety Program in 1992 for controls on boilers with input capacity of less than 12,500,000 Btu/Hr.

Decal: A report filled out by the inspector at time of inspection and left at the location, This is notification the object has been inspected.

Department: Department of Natural Resources and Environmental Control (DNREC).

Deputy Inspector: An inspector employed by the State of Delaware Boiler Safety Program**.**

Existing Installations:

- Any power or miniature boiler installed before January 1, 1924.
- Any electrically heated pressure vessel installed before August 8, 1953.
- Any steam heating, hot water supply or hot water heating boiler installed before May 11, 1954.
- Any pressure vessel installed before June 30, 1974.
- Controls and Safety Devices (CSD-1) was adopted for boilers installed after September 15, 1992.
- Pressure Vessels for Human Occupancy (PVHO-1) was adopted on July 1, 2009.

External inspection: An inspection of the exterior surfaces as defined in NBIC, when a boiler or pressure vessel is connected for use.

External piping:

- Power boilers- any pipe or fitting connected between the boiler and those limits

defined in ASME B31.1.

HLW: Part of ASME Code, Section IV, dealing with potable water heaters.

Inspector: A Deputy Inspector, Chief Inspector, Special Inspector, or an Owner/User Inspector.

Internal inspection: An inspection of the interior surfaces of a boiler or pressure vessel~~. as defined in the NBIC,~~

MTR: Material Test Report.

MAWP: Maximum Allowable Working Pressure.

Manager of the Boiler Safety Program: A State of Delaware Employee responsible for the administration of Delaware's Boiler Safety Program.

Mechanical Assembly - The work necessary to establish or restore a pressure retaining boundary, under supplementary materials, whereby pressure-retaining capability is established through a mechanical, chemical, or physical interface, as defined under the rules of the NBIC.

Mechanical Repair Method - A method of repair, which restores a pressure retaining boundary to a safe and satisfactory operating condition, where the pressure retaining boundary is established by a method other than welding or brazing, as defined under the rules of the NBIC.

National Board: "The National Board of Boiler and Pressure Vessel Inspectors".

National Board Commissioned Inspector: An individual who holds a valid and current National Board Commission.

NBIC: National Board Inspection Code - The manual for boiler and pressure vessel inspectors, published by the National Board of Boiler and Pressure Vessel Inspectors.~~, from which copies may be obtained~~ The NBIC is recognized for Repairs and Alterations, and Antique (Historical) boilers only (Part 3 only).
NDE: Non-Destructive Examination.

owner or user: Any person, firm, or corporation owning or operating any boiler, pressure vessel or nuclear installation within this state.

Owner/User Agency:

- An organization that is recognized by the Boiler Safety Program as having inspectors holding State of Delaware Owner/User Commissions that allow the inspectors to inspect pressure vessels owned and operated by the Delaware Owner/User Agency;

Owner/User Inspector;

- A Delaware Commissioned Inspector who has been issued a Delaware Certificate of Competency and works for a recognized Delaware Owner/User Agency.

Place of public assembly: Any establishment, building, location or any portion thereof within this State intended and used for occupation by persons while employed therein for compensation of any kind, any commercial structure and/or location to which the public has access.

Pressure-Retaining Items (PRI) - Any boiler, pressure vessel, piping, or material used for the containment of pressure, either internal or external. The pressure may be obtained from an external source, or by the application of heat from a direct source, or any combination thereof.

psi: pounds per square inch

psig: pounds per square inch gage.

Portable Boiler: An internally fired boiler primarily intended for temporary location, and the construction and usage of which is obviously portable.

Pressure Retaining Item (PRI): Any boiler, pressure vessel, piping, or material used for the containment of pressure, either internal or external. The pressure may be obtained from an external source, or by the application of heat from a direct source, or any combination thereof.

Pressure Vessel: Containers for the containment of pressure, either internal or external. The pressure may be obtained from an external source or by the application of heat from a direct or indirect source, or any combination thereof.

Repair: The work necessary to restore pressure retaining items to a safe and satisfactory condition such that the existing design requirements are met.

Secretary: The Secretary of the Department of Natural Resources and Environmental Control.

Shop Review: A general survey and examination of a boiler or pressure vessel manufacturing or repair firm's facilities, methods and records. The examination is performed by a designee of the ASME, and/or the National Board.

Special Inspector:
A National Board Commissioned Inspector and/or an AI, employed by an insurance company authorized to write boiler and pressure vessel insurance in Delaware.

Standard Boiler or Pressure Vessel: A boiler or pressure vessel which bears the stamp of the ASME and which is registered with the NB. Such items shall bear the appropriate ASME Code Symbol Stamp and the NB Registration number.

Note: Cast iron and cast aluminum boilers are exempted from National Board Registration.

State Special Number: A Delaware Registration Number assigned to a boiler or pressure vessel of non-standard design.

2.0 Scope

2.1 Any boiler or pressure vessel within the scope of these rules and installed in a place of public assembly, shall be subject to field inspection.

2.2 These regulations do not apply to the following types of equipment:

2.2.1 Any boiler or pressure vessel which is subject to federal inspection and control;

2.2.2 Any pressure vessel used for the transport or storage of compressed gasses and liquids under the control or regulation of the United States Department of Transportation;

2.2.3 Any air tank on any vehicle used for carrying passengers or freight and operated under the authority of any other state agency;

2.2.4 Any air tank installed on the right-of-way of railroads;

2.2.5 Any unfired pressure vessel not exceeding:

2.2.5.1 Five cubic feet in volume and 250 psig design pressure;

2.2.5.2 Three 3 cubic feet in volume and 350 psig design pressure,

2.2.5.3 One and one-half cubic feet in volume and 600 psig design pressure;

2.2.5.4 Vessels having an inside diameter, width, height, or cross section diagonal not exceeding 6 inch with no limitation on length of vessel or pressure.

2.2.6 Any unfired pressure vessel having an internal and/or external operating pressure not exceeding 15 psig;

2.2.7 Any unfired pressure vessel containing water at ambient temperature with a nominal water containing capacity of 120 gallons or less, including those with air or gas cushion, the compression of which serves only as a cushion;

2.2.8 Any water filter or softener containing water at ambient temperature when the pressure does not exceed 300 psig;

2.2.9 Any pressure vessel under the control of the State Fire Marshal;

2.2.10 High pressure breathing air cylinders used by emergency response organizations are exempt from inspection and certification provided they are installed, serviced, and maintained in accordance with the manufacturer's recommendations and the National Fire Prevention Association Standards, and the owner or user of this equipment shall be responsible for maintaining, testing, and servicing this equipment and shall keep all records associated with these activities as required by National Fire Protection Association Standards. The failure of any person to so install, service, test and maintain these air cylinders and to keep such records shall constitute a violation of this Chapter.

2.2.11 Any water heater, directly fired with oil, gas or electricity, which shall be equipped with American Society of Mechanical Engineers (ASME) stamped safety relief valves and which cannot exceed any of the following limitations:

2.2.11.1. Heat input of 200,000 Btu/hr. or 58,600 watts;

2.2.11.2 Water temperature of 210 degrees Fahrenheit; or

2.2.11.3 Nominal water capacity of 120 gallons.

2.2.12 Any coil type hot water boiler without any steam space where water flashes into steam released through a manually operated nozzle unless 1 of the following limitations is exceeded:

2.2.12.1 A 3/4-inch diameter tubing or pipe size, with no drum or headers attached;

2.2.12.2 Nominal water containing capacity does not exceed 6 gallons;

2.2.12.3 Water temperature does not exceed 350 degrees Fahrenheit; or

2.2.12.4 Steam is not generated within the coil.

2.2.13 Any water heater, indirectly fired, which shall be equipped with American Society of Mechanical Engineers (ASME) stamped safety relief valves and which cannot exceed any of the following limitations:

2.2.11.1. Heat input of 200,000 Btu/hr. or 58,600 watts;

2.2.11.2 Water temperature of 210 degrees Fahrenheit; or

2.2.11.3 Nominal water capacity of 120 gallons.

2.2.14 Hot water storage tanks or expansion tanks with a normal water containing capacity not exceeding 120 gallons.

2.2.15 Sterilizers – self contained type having an integral heating unit:

a. Internal volume of less than two (2) cubic feet

b. Electrically heated type shall bear the Underwriter's Laboratory listing marking,

are exempt provided that such sterilizers bear the UL label indicating the sterilizer meets the UL requirements. Possession or control of these sterilizers not bearing the UL label indicating the sterilizer meets the UL requirements shall constitute a violation of these regulations.

3.0 Codes and Standards:

3.1 The State of Delaware Boiler Safety Program has adopted the ASME Boiler and Pressure Vessel Codes for construction and stamping, including CSD-1 for controls and safety devices. Standards referenced by these rules are: ASME Code Sections I, II**,** III (all Sections), IV, V, VIII (Div.1, 2 and 3), IX, X, XI, PVHO-1, CSD-1, B31.1 (for boiler external piping) and Code Cases**.** Interpretations are not part of the ASME and National Board Codes and will be handled on a case by case basis**.**

3.2 The National Board Inspection Code has been adopted for repairs and alterations.

3.3 All Standards listed above refer to the latest accepted Edition..

4.0 Administration

4.1 Duties of Inspectors and Insurance Companies:

4.1.1 Inspectors shall:

4.1.1.1 Submit completed boiler or pressure vessel reports to the Boiler Safety Program within 30 days of inspection. First time inspections shall be submitted on the National Board Form NB-7, the Delaware First Inspection Report (Sample Form Exhibit 5), or filed electronically, Electronic reporting does not require submission of hard copies.

4.1.1.2 Report immediately to the Chief Inspector of the Boiler Safety Program the name of the owner or user who is operating any boiler or pressure vessel (a) without a valid certificate of inspection, or, (b) in an unsafe condition.

4.1.1.3 Report to the Chief Inspector of the Boiler Safety Program all accidents involving boilers and pressure vessels when informed of such accidents by the owner/user.

4.1.2 It shall be the duty of the insurance company to notify the Boiler Safety Program of installations on which insurance is accepted, refused, cancelled, or suspended. Such reports shall give detailed account of any unsafe conditions and shall be submitted within 30 days of such insurance acceptance or refusal.

4.2 Shop Inspections:

4.2.1 The shop inspections required by any applicable section of the ASME Boiler & Pressure Vessel Code shall be made by an Inspector who holds a valid commission issued by the National Board of Boiler & Pressure Vessel Inspectors, and having a valid "A" or "B" endorsement. A Certificate of Competency card, issued by the Boiler Safety Program, is required for all inspectors. An AI inspecting nuclear components requires the "N" endorsement.

4.3 Shop Reviews:

4.3.1 ASME and National Board Shop reviews shall be conducted by an ASME representative, a National Board representative, or the Boiler Safety Program ASME Designee.

4.5 Conflict of interest:

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

4.6 Appeals:

4.6.1 The Manager of the Boiler Safety Program of Boiler Safety may suspend or revoke a Certificate of Competency or a Delaware Commission, after due investigation for willful falsification of any matter or statement contained in his application, or in a report of any inspection made by him/her, and for any other finding of improper conduct. Written notice of any such suspension or revocation as required by 29 Del C. § 10131(c), shall be given by the Manager of the Boiler Safety Program to the inspector and his employer. An inspector whose Certificate of Competency or commission has been suspended or revoked shall be given ten days to appeal the decision to the Secretary of the Department of Natural Resources and Environmental Control. The notice of any proceedings shall conform to 29 Del. C. § 10122.

4.6.2 Appeal from decision of Inspectors

4.6.2.1 If the owner or user of any boiler, pressure vessel or nuclear installation disagrees with the Inspector, as to the necessity for shutting it down for making repairs or alterations to it, or taking any other measures for safety that may be requested by the Inspector, the owner or user may appeal the decision of the Inspector to the Manager of the Boiler Safety Program within an acceptable time limit as determined by the Manager of the Boiler Safety Program according to the severity of the violation. The owner/user will be notified of the time limit for appeal in the notice of violation. In case of a disagreement with the Manager of the Boiler Safety Program, an appeal may be filed with the Secretary, who will review the decision and may order another inspection, as the Secretary may deem necessary to decide the issue.

4.7 Accident

4.7.1 The owner or user shall notify the Boiler Safety Program when an accident occurs that renders a boiler or pressure vessel inoperative. In the case of a serious accident, as in a personal injury or an explosion, notice shall be given immediately by telephone.

No boiler, pressure vessel, or parts thereof involved in the accident, shall be removed or disturbed before an investigation can be conducted, except for the purpose of conserving human life and limiting consequential damage.

5.0 Manufacturers

5.1 Construction Standards

5.1.1 Boilers, pressure vessels, nuclear components and component parts to be installed for use in the State of Delaware, shall be designed, fabricated, inspected, stamped and installed in accordance with current applicable Sections of the ASME Boiler and Pressure Vessel Code, and these Rules and Regulations.

5.2 Stamping

5.2.1 Boilers, pressure vessels and nuclear components shall be stamped with the applicable ASME Code stamping and a National Board number, or the ASME Code Symbol and the word ("USER"), and if electrically heated a nationally recognized testing agency, such as, but not limited to the Underwriters Laboratory. Note: Cast Iron or cast aluminum boilers do not require National Board Registration.

5.2.2 The required stamping shall be visible for inspection and not permanently covered.

5.3 State Special:

5.3.1 If a boiler, pressure vessel or nuclear component is of special design and can not be built to the ASME Code, and have the ASME Code Symbol**,** and National Board or USER stampings, a permit for a

State Special must be applied for in writing by the Delaware user. Blueprints, design data, calculations and specifications shall be prepared by a Registered Professional Engineer, knowledgeable in the appropriate Code of Construction, and submitted to the Boiler Safety Program prior to construction.

6.0 Installation

6.1 A new boiler or pressure vessel installation, including a reinstalled or secondhand boiler or pressure vessel, shall be installed in accordance with the current edition:

6.1.1 The ASME Code.

6.1.2 Delaware Rules and Regulations.

6.1.3 ASME CSD-1

6.1.3.1 Part CF of CSD-1 shall be met when the installing contractor submits an operational test form CSD-1 Appendix C or a form containing the same information. (Exhibits 1 & 2) This is for boilers over 400,000 Btu/hr.

6.1.3.2 Part CM - The preventive maintenance schedule will be determined by the owner or user.

6.2 If a condition is not covered by these regulations, the applicable provisions of the ASME Code or NBIC for repairs and alterations shall govern.

6.3 External piping shall be made of materials accepted by the ASME Code.

6.4 Installation Registration

6.4.1 The installation of any boiler or pressure vessel within the scope of these rules, and installed in a place of public assembly, shall be registered with the Boiler Safety Program by the installer before the operation of the boiler or pressure vessel. (Exhibit 4) The boiler may be operationally tested prior to obtaining a certificate.

6.5 Clearances

6.5.1 All boiler installations shall have adequate clearance which should be 30 inch clearance on all sides or the distance stated in the manufacturer's specifications. If the Manufacturer specified minimum clearance is not available, a variance must be obtained from the Manager of the Boiler Safety Program prior to the boilers being installed.

6.5.2 All pressure vessels shall have adequate clearance for safe maintenance and inspection.

6.~~7~~6 Power Boilers

6.~~-~~6.1 New Installations

6.6.1.1 Ladders and runways. Steel runway or platform, at least twenty-four (24") inches wide, and provided with standard handrails and toe boards on either side, with at least 7' 6" head room, shall be installed across the tops of adjacent boilers, or at some other convenient level, for the purpose of affording safe access to the boilers. All runways shall have at least two (2) means of exit, each exit to be remotely located from the other and connected to a permanent stairway or inclined ladder leading to the floor level.

6.6.1.2 Exit from boiler rooms - all boiler rooms exceeding five hundred (500) square feet of floor area and containing one or more boilers having a fuel burning capacity of 1,000,000 BTU's shall have at least two (2) means of exit, one of which shall lead outside.

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

6.7 When a standard boiler, pressure vessel, or nuclear component located within this jurisdiction is to be moved outside the jurisdiction for repair, alteration, or modification, it shall be documented on the appropriated "R" form. Copies of all "R" forms shall be forwarded to the Boiler Safety Program.

6.8 The installation or operation of non-standard boilers, pressure vessels, or nuclear components in this jurisdiction without prior permission from the Manager of the Boiler Safety Program is prohibited.

6.9 High pressure Steam Boiler Blow Down Tanks and Receivers

6.9.1 Blow-off piping from a power boiler shall not discharge directly into a sewer or interconnected system. A blow-off tank shall be used where conditions do not provide adequate and safe open discharge and shall be placed between the boiler and the sewer or other such system.

6.9.2 Pressure or unvented blowdown tanks:

6.9.2.1 A blowdown tank subject to possible maximum steam boiler pressure shall be constructed for the boiler pressure and stamped in accordance with the ASME Code.

6.9.3 Atmospheric or vented blowdown tanks:

6.9.3.1 The outlet from the blowdown tank shall be not less than twice the area of the boiler blowdown pipe, and made to extend internally to within six inches of the bottom of the tank.

6.9.3.2 A vent pipe at least twice the diameter of the inlet shall lead to the outside atmosphere. Vents shall be as direct as possible to the outside atmosphere and discharge at a point not less than seven feet above grade. No valve, water pocket, or other obstruction shall be in this line.

6.10 Centrifugal type separators:

6.10.1 Centrifugal type separators shall be built and stamped in accordance with the ASME Code.

6.10.2 Separators may be used when a safe point of discharge is available and the pressure and temperature conditions at the point of discharge need not be considered.

6.10.3 Separators may be used as an auxiliary to a blowdown tank but may not be used in lieu of a conventional blowdown tank in those installations requiring a blowdown tank.

7.0 Non-standard Boilers or Pressure Vessels

7.1 Non-standard high-pressure boilers, which were installed in the State of Delaware prior to January 1, 1924, shall be subject to the rules of the ASME Boiler Code for calculations and installation. Non-standard pressure vessels installed prior to June 30, 1974, shall be calculated and installed in accordance with ASME Code Section VIII, and the following rules:

7.1.1 Factors of Safety. The minimum factor of safety may not be less than 4 for existing installations. The factor of safety may be increased when it is considered necessary by the inspector to insure the operation of the vessel within safe limits. The condition of the vessel and the particular service to which it is subject shall be the determining factors.

7.1.3 The owner or user and the inspector shall agree what further NDE will be required to verify the integrity of the vessel.

7.1.4 When a non-standard boiler, pressure vessel, or nuclear component is removed from this jurisdiction for reason other than repair or alteration, it shall not be brought back and installed within this State.

7.1.5 Maximum Allowable Working Pressure for Non-standard Pressure Vessels.

7.1.5.1 Internal Pressure. The maximum allowable working pressure on the shell of a nonstandard pressure vessel is determined by:

7.1.5.1.1 The strength of the weakest course computed from the thickness of the plate.

7.1.5.1.2 The tensile strength of the plate.

7.1.5.1.3 The efficiency of the longitudinal joint.

7.1.5.1.4 The inside diameter of the course.
7.1.5.1.5 The factor of safety set by these rules.

$$\text{maximum allowable working pressure, psig} = \frac{TSt+E}{RFS}$$

Where:
TS = Ultimate tensile strength of shell plate, PSI. When the tensile of shell plate is not known, it shall be taken as 55,000 PSI for temperatures not exceeding 700 F.

t = Minimum thickness of shell plate of weakest course, inches.

E = Efficiency of longitudinal joint depending upon construction. Use the following values: for riveted joints the calculated riveted efficiency; and for fusion-welded and brazed joints:

	Percent
Single Lap Weld	40
Double Lap Weld	60
Single Butt Weld	60
Double Butt Weld	75
Forge Weld	70
Brazed Steel	80

R = Inside radius of weakest course of shell, 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.

FS = Factor of safety allowed by these rules.

7.1.5.2 External Pressure: The maximum working pressure for cylindrical nonstandard pressure vessels subjected to external or collapsing pressure shall be determined by the rules in the appropriate ASME Code Section VIII, Div. I, 2, or 3

7.1.6 A State Special number may be assigned to a boiler or pressure vessel of non-standard design. All designs and specifications must be submitted to the Boiler Safety Program for approval and must include:

7.1.6.1 Drawings and calculations certified by a mechanical engineer from the original manufacturer, or a Delaware registered professional engineer.

7.1.6.2 Material test reports certified by the original manufacturer or a material testing laboratory.

7.1.6.3 Report of a pressure test certified by the owner and a Delaware commissioned Inspector.

7.1.6.4 Report of an internal & external inspection by a Delaware commissioned Inspector.

7.1.6.5 Establish that welding meets the requirements of the ASME ***C***ode.

7.1.6.6 If any of the above documentation has been lost, it will be necessary to fulfill the basic requirements by some other means acceptable to the Chief Inspector of the Boiler Safety Program.

8.0 Inspections

8.1 Access for inspection.

8.1.1 The Secretary, Chief Inspector of the Boiler Safety Program, Deputy Inspector, Special Inspectors, or members of the Council on Boiler Safety, shall have full access during reasonable hours to any premises in the State, where a boiler, pressure vessel or nuclear component within the scope of these Rules and Regulations is being constructed, installed, connected for use or operated, to ascertain compliance with these Rules and Regulations. Immediate access must be provided upon event of an accident.

8.2 Inspection Requirements

8.2.1 High-pressure boilers, miniature boilers and high-pressure high temperature water boilers shall receive a certificate of inspection annually. They shall also be inspected internally annually. The external (in service) inspection should be done within six months of the internal inspection.

8.2.2 Low-pressure steam heating boilers, hot water heating boilers, hot water supply boilers, and lined water heaters, shall be given a certificate of inspection biennially. This inspection may be an external inspection, unless the Inspector requires an internal inspection. The Inspector, due to operating conditions, may require additional inspections.

8.2.3 All pressure vessels shall be given a certificate of inspection every four years. This inspection may be an external inspection, unless the Inspector requires an internal inspection. The Inspector, due to operating conditions such as corrosive conditions or lethal service, may require additional inspections or request the certificate be for two years instead of 4 years.

8.2.3.1 The Department may grant an alternate approval for a pressure vessel to operate for a period of 10 days provided they have a valid certificate from another jurisdiction.

8.2.3.2 Any air cannon used in competition prior to 2004 that does not have ASME code welds must pass a hydrostatic test once every 2 years to continue to be allowed to operate.

8.2.4 Thermal Fluid Heaters (Boilers) shall receive a certificate inspection annually. They shall also be externally inspected annually. During the annual inspection, the Relief Devices test history shall be reviewed and safety controls checked. The inspector may require additional inspections due to conditions found.

8.3 Certificate Inspections

8.3.1 Certificate inspections will be allowed a grace period of one month beyond the normal inspection date, with extensions to the above, granted only by the Manager of the Boiler Safety Program. A current Certificate of Inspection must have a decal attached by the Inspector using the decals provided by the Boiler Safety Program. Violation of this paragraph will subject the owner/user to the penalty, as provided in 7 Del.C. §74B

8.3.2 If, at the discretion of the Inspector, a hydrostatic test or any other test is deemed necessary, it shall be made by the owner or user of the boiler or pressure vessel.

8.3.3 Sufficient covering of the boiler or pressure vessel shall be removed to satisfy the Inspector that he may determine the conditions of the boiler or pressure vessel. If the covering cannot be removed at that time, the inspector may order the operation of the boiler or pressure vessel stopped until such time as the covering can be removed and proper examinations made.

8.4 Alternate Internal Inspection Requirements

8.4.1 High-pressure boiler internal inspection may be extended to 24 months; and 48 months for waste heat boilers, if the following requirements are met:

8.4.1.1 Continuous water treating under the general supervision of a trained person with /experience in water treatment for the purpose of controlling and limiting corrosion and deposits.

8.4.1.2 Record keeping available for review showing:

8.4.1.2.1 The date and time boiler is out of service and the reason therefore.

8.4.1.2.2 Daily analysis of water samples that will adequately show the condition of such water and any elements or characteristics which are capable of producing corrosion or other deterioration of the boiler or its parts.

8.4.1.3 Annual external inspections performed by an Inspector with review of records in 8.4.1.1 and 8.4.1.2 above and enter results in comments section of his report.

8.4.1.4 Applicable NDE, if required by the Inspector. Records are to be

maintained at least six (6) years. In order to qualify for such an extension, a written request to the Manager of the Boiler Safety Program must be made. This extension, when granted, is good until revoked.

8.4.2 The Manager of the Boiler Safety Program upon written requests may grant other extensions from the owner user with approval of the AIA.

8.5 Condemned boiler or pressure vessel

8.5.1 This is a vessel that is declared unsafe by an Inspector, due to an irreversible defect, and removed from service. It shall be stamped as follows:

8.5.1.1 XXXDELXXX -- adjacent to original stamping

8.6 The inspections required by this Section shall be made by the Chief Inspector, by a Deputy Inspector, an Owner/User inspector, or by a Special Inspector.

8.6.1 If an owner or user of equipment, specified by this Section, obtains an insurance policy on such equipment from an insurance company licensed by the Delaware Insurance Commissioner's Office to insure boilers and pressure vessels, the Special Inspector employed by that insurance company shall conduct the inspection required by this Section.

8.6.2 An Inspector employed by an Owner-User or a State of Delaware Owner/User may conduct the inspections on pressure vessels owned by that company in lieu of a State or Insurance Company Inspector.

9.0 Certificate of Inspection

9.1 Issuance of Certificate

9.1.1 If upon making the required inspection, the Inspector finds the boiler, pressure vessel or nuclear installation to be in a safe working order, including all necessary safety devices shall submit a report to the Boiler Safety Program. When the Boiler Safety Program receives the report, either electronically or upon receipt of the inspection report (hard copy) from said Inspector, and the fee mentioned hereafter paid, shall issue a Certificate of Inspection. The certificate shall be posted on or near the object.

9.1.2 At the time of the first inspection, the Inspector shall assign the Delaware State Number (sequential number on seal) and leave a decal at the site.

9.1.3 On subsequent inspections, the inspector will attach the decal to the Certificate of Inspection. Any corrections or changes to the inspector's request form will be circled and changes noted and returned to the Boiler Safety Program. If reports are submitted electronically, no decals or hard copies of report have to be submitted to the Boiler Safety Program.

9.1.4 In the event of a violation of these regulations or unsafe condition, the inspector will indicate on the decal the object “failed” and return the inspection request to the Boiler Safety Program. No decal or hard copy of report is required to be submitted if report is submitted electronically. A decal marked “failed” will be left at location if object does not meet requirements for issuance of a certificate.

9.2 Certificates for boilers, pressure vessels or nuclear installations

9.2.1 Every inspector inspecting boilers, pressure vessels or nuclear installations in the State of Delaware shall file with the Manager of Boiler Safety Program the applicable inspection report within thirty (30) days, after the date of inspection. The report can submitted either electronically or a hard copy.

9.3 Certificate withdrawn, withheld, or revoked.

9.3.1 If an Inspector finds that the boiler, pressure vessel or nuclear installation is not in safe working condition, or is not provided with the necessary safety appurtenances, or if the appurtenances are improperly arranged, the inspector shall immediately notify the owner or user, and the person in charge of the boiler, of the code violations. The inspector shall report the same to the Manager of Boiler Safety Program. The owner and/or user shall not operate it or permit it to be operated, until such Certificate has been granted or restored.

10.0 Safety and Relief Valves and Rupture disks.

10.1 Installation of pressure relief valves, safety valves and rupture disks shall be in accordance with the appropriate Section of the ASME Code. A hot water supply boiler, including lined water heaters stamped HLW shall have a pressure temperature relief valve marked 210 F.

10.2 When any of the safety/relief valves require repairs or adjustments, these adjustments must be made by the manufacturer or an appropriate "VR" stamp repair company, and tested either before reinstallation or immediately upon placing the boiler, pressure vessel or nuclear installation in service.

10.3 No person shall load or adjust safety/relief valves in any matter to maintain a working pressure in excess of that stated on the certificate of inspection.

10.4 The owner ***or*** user shall assure that the safety valve(s) is functional at all times.

10.5 All low-pressure boiler safety and relief valves shall be determined to be functional at time of inspection.

10.6 All high pressure boiler safety valves shall be hand tested, or bench tested for set pressure and blowdown at the time of inspection or within the maximum allowable inspection interval provided by these regulations. In lieu of bench testing, the hydraulic lift system is acceptable. All high-pressure boiler safety valves for pressures over 400 PSIG shall be overhauled every five (5) years.

10.7 All pressure vessel relief valves shall be hand tested, or bench tested for set pressure at the time of inspection or within the allowable inspection interval permitted by these regulations. In lieu of bench testing, the hydraulic lift system is acceptable. The frequency may be extended when supported by performance records of the individual user. For liquids or gasses, which are hazardous or costly and in-service testing is impractical, bench testing/replacement frequency shall be done every five (5) years and documented

10.8 Bench testing is only acceptable if the bench testing apparatus can deliver proper pressure and volume. Sufficient volume should be enough to lift the pressure relief valve fully open.

10.9 Pressure vessel relief valves on installations must be overhauled or replaced every four (4) years where there is documented corrosion, deterioration of valve parts, product build up, or the possibility of plugging in the inlet or outlet, or sticking of the disc to the seat.

10.10 Thermal Fluid Heater Pressure Relief Devices shall meet the requirements of ASME Section I Part PVG.

10.10 Thermal Fluid Heater safety valves shall be disconnected at least once yearly, when they shall be inspect

11.0 Antique Boilers (The NBIC addresses “Historical “boilers but has no age limit.)

11.1 Antique boilers include any closed vessel manufactured prior to January 1, 1924, and used solely for display and demonstration purposes, in which water is heated or steam is generated by the direct application of heat from the combustion of fuels.

11.1.1 An AI shall inspect antique boilers and remaining material thickness will be determined by a method acceptable to the AI. The MAWP based on these Rules and Regulations, as determined by a Registered Professional Engineer knowledgeable in power boiler fabrication, shall be submitted to the Manager of Boiler Safety Program for ~~his~~ review and acceptance.

11.1.2 All antique boilers shall be inspected annually and shall include the following:

11.1.2.1 A hydrostatic test at 1 1/4 times the MAWP

11.1.2.2 ASME approved fusible plug installed and in good condition. Fusible plug shall be replaced annually.

11.1.2.3 A safety valve meeting current ASME and National Board requirements set at or below the MAWP, with required relieving capacity, and tested, as required by these regulations. The seals on the valve shall be intact. The outlet of safety valve shall be piped to a safe point of discharge.

11.1.2.4 A visual examination for any evidence of corrosion or leakage to include the boiler piping up to the first valve.

11.1.2.5 Any other requirements specified in the Boiler Safety Program’s regulations.

11.1.2.6 Ultrasonic thickness testing of boiler shall be performed every 4 years and the results recorded and maintained for review by the inspector.

11.1.3 Approval for operation of an antique boiler will be granted upon successful completion of the above inspection requirements and payment of the fee required. A Certificate will be issued and shall be valid for a period not to exceed 12 months. A fee of $15.00 shall be charged for inspections and a fee of $15.00 shall be charged for the certificate. A current operating certificate shall be posted while in operation.

11.1.4 Alternate approval may be given to operate an antique boiler having a valid certificate from another State, whose requirements have been determined by the Boiler Safety Program to meet or exceed the current Edition and Addenda of the NBIC and these requirements.

11.1.5 Request for approval must be submitted 30 days prior to operation.

12.0 Repairs or Alterations by Fusion Welding

12.1 Repairs and alterations to boilers and pressure vessel shall comply with:

12.1.1 The original construction standard or later editions of the construction standard,

12.1.2 The latest accepted edition of the National Board Inspection Code, and

12.1.3 These Rules & Regulations.

12.2 All repairs or alterations to boilers, pressure vessels or piping within jurisdictional limits**,** shall be approved by a Delaware commissioned AI and performed under his guidance.

12.3 The organization making the repair or alteration shall possess a valid National Board Repair Certificate of Authorization

12.3.1 National Board Repair Certificate of Authorization is required for any repair or alteration work performed in or out of the manufacturer's premises.

12.3.2 Design changes shall be certified by an organization having an approved Q.C. Program, which includes control of drawings, design calculations and specifications. These controls shall meet or exceed ASME requirements.

12.3.3 The work shall be within the scope of their Q.C. program.

12.4 An R-1 "Record of Welded Repair" shall be filed with the Boiler Safety Program with the Delaware jurisdiction number clearly identified.

12.5 An R-2 "Report of Alteration" with a copy of the manufacturer's data report shall be filed with the Boiler Safety Program, with the Delaware jurisdiction number clearly identified.

12.6 Repairs of a routine nature as defined by the NBIC need not have a "Report of Welded Repair" submitted to the Manager of Boiler Safety Program, but this repair documentation must be retained by the owner ***or*** user as long as the object remains in service. "Routine Repair" shall be entered in "Remarks" section of the R-1 Form.

12.7 Lap Seam Cracks

12.7.1 The shell or drum of a boiler or pressure vessel in which a lap seam crack is discovered along a longitudinal riveted joint shall be immediately condemned and permanently removed from service. Repairs of this type defect are prohibited.

12.8 Riveted Patches

12.8.1 In applying riveted patches, the design of the patch and method of installation shall be in accordance with the NBIC.

12.9 Repair, modification or replacement of nuclear components

12.9.1 Repair, modification or replacement of nuclear components shall be made only by an organization which holds a valid Certificate of Authorization for use of the appropriate National Board nuclear symbol stamp. Repair, modification or replacement of ASME stamped "NV" pressure relief valves shall be made only by an organization which holds a valid National Board Certificates of Authorization for use of the "NR" and "VR" symbol stamps.

12.10 Re-stamping of Boilers and Pressure Vessels shall be in accordance with the NBIC and jurisdictional requirements.

13.0 Fees

13.1 Inspection and certificate of inspection fees:

13.1.1 The owner and/or user of a boiler, pressure vessel or nuclear installation required to be inspected under these Rules & Regulations shall pay the required fees.

13.1.2 All checks should be made payable to the Boiler Safety Program and sent directly to the office by the owner and/or user.

13.2 Certificate of Inspection Fees:

13.2.1 Boiler and pressure vessel certificate fees are $7.50 annually.

13.3 Inspection Fees:

13.3.1 Power Boilers & High Pressure/High Temperature Hot Water Boilers:

13.3.1.1 Internal inspection under 5 HP	$15.00
5 HP up to 99 HP	$25.00
99 HP up to 200 HP	$35.00
Over 200 HP, on an hourly Basis with a minimum fee of	$50.00
13.3.1.2 External Inspection	$15.00

13.3.2 Heating Boilers and Hot Water Supply Boilers:

13.3.2.1 Without a manhole	$15.00
13.3.2.2 With a manhole	$25.00

13.3.3 Water heater $10.00

13.3.4 Pressure Vessels

13.3.4.1 The required inspection fee shall be based on the cross-sectional area in square feet obtained by multiplying the external diameter of the vessel in feet by the external length of the vessel in feet.

Fifty (50) square feet or less	$10.00
Each additional 100 square feet or fraction thereof in excess of 50 square feet	$20.00

13.3.4.2 A group of pressure vessels such as rolls of a paper machine or a dryer operating as a single machine or unit shall be considered as one pressure vessel and the inspection fee shall be based on the actual hourly inspection time.

13.3.5 Hydrostatic tests

13.3.5.1 When it is necessary to make a special trip to witness the application of a hydrostatic test, the fee for such service shall be based on the actual hourly inspection time including travel**.** The entire expense of applying the hydrostatic test shall be borne by the owner and/or user.

13.3.6 Nuclear Installations

13.3.6.1 The inspection fee is based on actual hourly inspection time at an hourly or daily rate determined by the Manager of the Boiler Safety Program, dependent on the type of qualified personnel necessary to perform the required safety inspections.

13.3.7 Shop Reviews

13.3.7.1 A fee of $1500 per ASME and National Board “R” review requires a team leader and if available, a jurisdictional representative to be present. A fee of $800 per review, if only a National Board “R” authorization is requested.

13.3.7.2 A fee based on actual hourly based rates per review of Delaware Owner/User Inspection Agencies.

13.4 Miscellaneous Fees:

13.4.1 Inspectors Commission Fees

13.4.1.1 National Board Examination

$75.00, for Delaware resident; $150, non-Delaware resident.

13.4.1.2 Examination for a Delaware Inspector Commission $50

13.4.1.3 Biennial (2 yr.) Commission Credential card renewal $25

13.4.1.4 Replacement of lost or destroyed Commission $20

13.4.2 Permit for State Special

13.4.2.1 Boiler or Pressure Vessel $500 minimum

13.4.2.2 Nuclear installation $2000 minimum

14.0 Gas Water Heaters Suitable For Potable Water And Space Heating

14.1 Units Covered

14.1.1 Gas water heaters, which are suitable for potable water and space heating, shall be covered by this Section provided the water heater does not exceed any of the following limitations:

14.1.1.1 Maximum heat input of 200,000 BTU per hour or 58,600 watts;

14.1.1.2 Maximum water temperature limit of 210 degrees Fahrenheit (99 degrees Celsius); or

14.1.1.3 Nominal water containing capacity of 120 gallons (454.2 L).

14.1.2 This Section shall cover the water heater, heat exchanger, coil or any other device connected directly or indirectly to the water heater and used to supply potable hot water and space heating.

14.2 Gas Water Heaters Suitable for Potable Water and Space Heating with Input Ratings of 75,000 BTU per Hour or less

14.2.1 In addition to the requirements in Subsection A of this Section, gas water heaters suitable for potable water and space heating with input ratings of 75,000 BTU per hour or less shall also be constructed and installed in accordance with the American National Standard for Gas Water Heaters, Volume 1, ANSI Z21.10.1, current edition and addenda, including, but not limited to Z21.10.la, current edition and addenda, as well as all applicable Federal, State and local laws and regulations. Water heaters covered by this Section are not required to be constructed to the standards set forth in Section IV, ASME Boiler and Pressure Vessel Code, except to the extent required by ANSI Z21.10.1, current edition and addenda.

14.3 Gas Water Heaters Suitable for Potable Water and Space Heating with Input Ratings in excess of 75,000 BTU per Hour but with a Maximum of 200,000 BTU per Hour

14.3.1 In addition to the requirements of 14.1 of this Section, gas water heaters suitable for potable water and space heating, with input ratings in excess of 75,000 BTU per hour, but not more than 200,000 BTU per hour, shall be constructed and installed in accordance with the American National Standard for Gas Water Heaters, Volume III, ANSI Z21.10.3 , current edition and addenda, as well as applicable Federal, State and local laws and regulations.

14.4 Limitations

14.4.1 All units covered by this Section shall not be connected to any existing non-potable water heating system.

14.4.2 No more than one (1) unit covered by this Section shall be connected to a circulating system.

14.4.3 This Section shall not apply to closed loop systems.

14.5 Inspection

14.5.1 Exemption from field inspection of units covered by this Section shall be governed by 29 Del.C. §8028.

14.5.2 These exempt water heaters shall be equipped with ASME Code approved pressure/temperature relief valves.

14.6 Oil fired combination service water heating or space-heating equipment shall meet the requirements of the ASHRAE/IES 90.1, current edition and addenda.

15.0 Jacketed Cooking Kettles

15.1 Fired jacketed cooking kettles built to ASME Section VIII Division 1 shall meet the requirements of ASME Section VIII Division 1 Appendix 19:

a. No steam or water shall be withdrawn from the jacket for use external to the vessel and operating pressure of the jacket shall not exceed 50 psi.

b. An ASME approved relief valve shall be installed set at or below the allowable working pressure of the jacketed cooking kettle with the minimum relieving capacity as required by the manufacturer.

c. There shall be a pressure gage installed on the jacket.

d. There shall be a water gage glass; or alternatively, for electrically heated jacketed steam kettles with immersion type heating elements, a low level warning light.

e. There shall be a separate connection, fitted with a stop valve, for venting air or adding water to the jacket (the water may be added while the vessel is not under pressure).

f. There shall be an electric heater control or automatic gas valve controlled by pressure to maintain the steam pressure in the jacket below the safety valve setting.

g. There shall be a low water cutoff that will cut off the fuel to the burner or power to the heating elements on a low water condition.

1***6***.0 Variances

16.1 The Manager of the Boiler Safety Program shall have the authority to grant a variance, on a case by case basis, to those rules and regulations that pertain to the installation of new boilers to replace existing boilers. The variance shall be in writing describing all pertinent information regarding the variance requested and the reason for the request.

17.0 Complaints

17.1 When the Boiler Safety Program receives a complaint a boiler or pressure vessel is being operated in an unsafe condition or does not meet codes, an investigation shall be conducted by either a State Deputy Boiler Inspector, or by the inspector employed by the insurance company carrying boiler machinery insurance on the object. A report will be submitted to the Manager of the Boiler Safety Program, and appropriate action will be taken depending on the conditions found.

18.0 Severability

18.1 If any part of these Rules and Regulations are held invalid, unconstitutional, or otherwise contrary to law, then it shall be severable and the remaining portions hereof shall remain and continue in full force and effect.

20.0 Code Variations (the following are code variances)

20.1 The re-rating or re-calculating of a new minimum wall thickness for pressure retaining items using a later edition/addenda of the original code of construction in the National Board Inspection Code (NBIC) is disallowed and prohibited.

20.2 The application of a NB number to a boiler or pressure vessel after it has been placed in service is not permitted without prior approval of Boiler Safety

21.0. Delaware Owner/User Agency and Inspectors

21.1 Owner/User Inspector

a. The Manager shall , upon the request of any company maintaining a Delaware Owner/User Inspection Agency and operating pressure vessels in this State, issue an Owner/User Commission to an inspector that meets the requirements stated in 20.2, the inspector is continuously employed by the company, and satisfactorily passes a written examination based on the requirements of the latest Edition of the Rules and Regulations of the Boiler Safety Program.

21.2 Examination for Certificate of Competency

A. Examination for a certificate competency as a Delaware Owner/User inspector of pressure vessels shall be held at the office of the Boiler Safety Program or at any location selected by the Manager of the Boiler Safety Program.

B. An applicant for an examination shall have education and experience equal to at least one of the following:

b.1 A degree in mechanical engineering plus one year experience in the design, construction, operation, or inspection of high pressure boilers, pressure vessels, or nuclear installations.

b.2 A degree in a branch of engineering, other than mechanical engineering, plus (2) years of experience in the design, construction, operation or inspection of high pressure boilers, pressure vessels, or nuclear installations.

b.3 The equivalent of a high school education plus three (3) years of experience (1) in high pressure boiler, pressure vessel, nuclear construction or repair or (2) as an operating engineer in charge of a high pressure boiler, pressure vessel, or nuclear installation operation; or (3) as an inspector of high pressure boilers, pressure vessels, or nuclear installations.

C. Applications for examination shall be in writing on a form furnished by the Boiler Safety Program stating the school education of the applicant, a list of employers, period of employment and position held with each employer. Applications containing willful falsifications or untruthful statements will be rejected. If the applicant's history and experience meet with the approval of the Manager of the

Boiler Safety Program, the applicant shall be given a written examination dealing with the construction, installation, operation, maintenance, repair and inspection of boilers, pressure vessels, and nuclear installations and their appurtenances. The applicant shall be accepted or rejected on the merits of this examination. If the applicant is successful in meeting the requirements of the examining Board, a Certificate of Competency will be issued by the Manager of the Boiler Safety Program.

21.3. Owner/User Inspection Agency

A. Within 6 months of the effective date of these regulations, any company which maintains a regularly established inspection department in the State of Delaware, has a written Quality Control manual that is accepted by the Manager of the Boiler Safety Program and reviewed every three years, employs owner/user inspectors qualified under the provisions of 20.1.a, and desires to inspect pressure vessels for its own use and operation in the State of Delaware shall apply on its letterhead requesting registration.

B. An Owner/User Inspection Agency shall only be authorized to do in-service inspections of pressure vessels it owns and operates in the State of Delaware and not available for re-sale.

C. The Quality Control Manual shall contain:

1. Title Page
2. Contents Page
3. Scope of Work
4. Statement of Authority and Responsibility
5. Organization
6. Inspection Methods
7. Reporting
8. Training
9. Control of Contract Services
10. Exhibits

Exhibit 1

APPENDIX C – MANUFACTURER'S/INSTALLING CONTRACTOR'S REPORT FOR ASME CSD-1

Certification and Reporting (CG-500) for Controls and Safety Devices
(This Form is a guideline and is not part of ASME CDS-1 1998.)

Unit Manufacturer

Name _____

Address _____ Zip _____

Telephone _____ Fax _____

Unit Identification (Boiler)

Manufacturer's Model # _____ Year Built _____

ASME # _____ Nat. Bd. # _____

UL # _____ AGA # _____

Jurisdiction _____

Steam **Hot Water**

Max W.P. _____ psig Max. W.P. _____ psig

Min. Safety Valve Cap. _____ PPH Max. Temp. _____ º F

Min. Safety Relief Valve Cap._____ PPH or Btu

Boiler Unit Description (Type) _____

If Modular (No. of Modules) _____

Boiler Unit Capacity (Output) _____

Burner

Manufacturer _____ Model _____

UL or AGA # _____ Serial # _____

Fuels (as Shipped) _____

Installation Location (if known)

Customer Name _____

Address _____

City _____ State _____ Zip _____

Telephone _____ Fax _____

Exhibit 1

Control/Device	Manufacturer	Model	Operational Test Performed, Date
Operating Controls			
Low-Water Fuel Cutoff CW-120(a), CW-140			
Forced Circulation CW-210(a)			
Steam Pressure CW-310(b)			
Water Temperature CW-410(b)			
Safety Controls			
Low-Water Fuel Cutoff CW-120(a), CW-120(b) CW-130, CW-140			
Forced Circulation CW-210(b)			
High Steam Pressure Limit CW-310(c)			
High Water Temperature Limit CW-410(b)			
Fuel Safety Shutoff Valve, Main CF-180(b)(2), CF-180(b)(3)			
Pilot Safety Shutoff Valve CF-180(c)			
Atomizing Medium Switch CF-450(b)			
Combustion Air Switch CF-220			
High Gas Pressure CF-162			
Low Gas Pressure CF-162			
Low Oil Pressure CF-450(a)			
High Oil Temperature CF-450(c)			
Low Oil Temperature CF-450(d)			
Purge Air Flow CF-210			
Flame Safeguard (Primary) CF-310, CF-320			

Exhibit 1

Low Fire Start

Low Fire State Switch
CF-610 _____ _____ _____

Safety or Safety Relief Valve(s)
CW-510, CW-520 _____ _____ _____

Manufacturer _____ Operational Test Performed, Date ___/___/___

Model _____

Size _____

Capacity _____ PPH/Btu/hr

Representing Equipment Manufacturer, Name _____

Signature _____ Date _____

Representing Installing Contractor, Name _____

Signature _____ Date _____

Exhibit 2

Delaware The Boiler Safety Program
INSTALLING CONTRACTOR'S Operational REPORT

Installation Location

Owners Name _____

Address _____

City _____ State _____ Zip _____

Telephone _____ Fax _____

Unit Manufacturer

Name _____

Unit Identification (Boiler)

Manufacturer's Model # _____ Year Built _____

ASME # _____ Nat. Bd. # _____

~~Jurisdiction~~ _____

Steam **Hot Water**

Max W.P. _____ psig Max. W.P. _____ psig

Min. Safety Valve Cap. _____ PPH Max. Temp. _____ º F

Min. Safety Relief Valve Cap._____ PPH or Btu

Boiler Unit Description (Type) _____

If Modular (No. of Modules) _____

Boiler Unit Capacity (Output) _____

Burner

Manufacturer _____ Model _____

Fuels (as Shipped) _____

Exhibit 2

Control/Device	Manufacturer	Model	Operational Test Performed, Date
Operating Controls			
Low-Water Fuel Cutoff CW-120(a), CW-140			
Forced Circulation CW-210(a)			
Steam Pressure CW-310(b)			
Water Temperature CW-410(b)			
Safety Controls			
Low-Water Fuel Cutoff CW-120(a), CW-120(b) CW-130, CW-140			
Forced Circulation CW-210(b)			
High Steam Pressure Limit CW-310(c)			
High Water Temperature Limit CW-410(b)			
Fuel Safety Shutoff Valve, Main CF-180(b)(2), CF-180(b)(3)			
Pilot Safety Shutoff Valve CF-180(c)			
Atomizing Medium Switch CF-450(b)			
Combustion Air Switch CF-220			
High Gas Pressure CF-162			
Low Gas Pressure CF-162			
Low Oil Pressure CF-450(a)			
High Oil Temperature CF-450(c)			
Low Oil Temperature CF-450(d)			
Purge Air Flow CF-210			
Flame Safeguard (Primary) CF-310, CF-320			

Exhibit 2

Low Fire Start

Low Fire State Switch
CF-610 _____ _____ _____

Safety or Safety Relief Valve(s)
CW-510, CW-520 _____ _____ _____

Manufacturer _____ Operational Test Performed, Date ___/___/___

Model _____

Size _____

Capacity _____ PPH/Btu/hr

Representing Equipment Manufacturer, Name _____

Signature _____ Date _____

Representing Installing Contractor, Name _____

Signature _____ Date _____

BoilerSafety01-05

Exhibit 2

Exhibit 3

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTRL
THE BOILER SAFETY PROGRAM

APPLICATION FOR EXAMINATION

I hereby make application for a Certificate of Competency and/or a Commission as a Special Inspector of Boilers and Pressure Vessels, and certify that the following statements are correct:

Name in full _____ Age _____
(Print or Type)

Birthplace _____ Present residence _____
(City or Town) *(State or County)* *(Number, street, city, state, zip code)*

Employed by _____

My business address with the above named Company will be at _____
(Number, street, city, state, zip code)

Are you a citizen of the U.S.? _____

1. School Education _____ Degree _____
(M.E., E.E., C.E., ETC.)

2. BOILER OR PRESSURE VESSEL SHOP EXPERIENCE		
Employer's Name	*Period of Employment	Employed as
	From to	
	From to	
	From to	

3. BOILER OR PRESSURE VESSEL INSTALLATION EXPERIENCE		
Employer's Name	*Period of Employment	Employed as
	From to	
	From to	
	From to	

4. BOILER OR PRESSURE VESSEL OPERATING EXPERIENCE		
Employer's Name	*Period of Employment	Employed as
	From to	
	From to	
	From to	

5. BOILER OR PRESSURE VESSEL INSPECTION EXPERIENCE		
Employer's Name	*Period of Employment	Employed as
	From to	
	From to	
	From to	

**Give month and year of each period of Employment*

Exhibit 3

6. National Board examinations taken _____ Date _____
(State)

7. Kind of examinations taken _____ Certificate No. _____

8. Are you familiar with the A.S.M.E. Boiler & Pressure Code, The Delaware and National Board Regulations? _____

9. Have you completed any courses in Non Destructive Testing? _____

_____ _____ _____
school *dates of attendance* *certificate?*

_____ _____
instruments used in training *instruments used in your plant*

10. Experience in inspection of unfired pressure vessels? _____

_____ _____ _____
years *company* *type of plant*

11. Have you had training or experience in welding? _____

_____ _____ _____
school *employed by* *years*

12. Have you had training or experience in metallurgy? _____

_____ _____ _____
school *certificate?* *Dates*

(Only applicable if applying under owner-user provisions

13. Name of Professional Engineer in your plant responsible for the pressure vessels:

_____ _____
Inspection Department *Degree*

_____ _____
Delaware P.E. Number *Date of expiration*

(This application to be sworn to before a Notary Public)

Sworn to and subscribed before me on this, the _____ day of _____

_____ _____
(Signature of Applicant) *Notary Public*

dbs-1(2001)

Exhibit 4

BOILER AND PRESSURE VESSEL INSTALLATION REGISTRATION

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND EVIRONMENTAL CONTROL
THE BOILER SAFETY PROGRAM

(Complete appropriate portion)

Send completed form to:

The Boiler Safety Program
P.O. Box 674
Dover, Delaware 19903-0674

BOILER TYPE:

o Power o Heating o Miniature

o Pressure Vessel

o New o Used

NAME OF USER OR OWNER			LOCATION OF INSTALLATION		
STREET ADDRESS			REGISTRATION NO. DE.	NATIONAL BOARD NO.	
CITY	STATE	ZIP CODE	MFR. SERIAL NO.	OTHER NO.	
NAME OF INSTALLING CONTRACTOR		SIGNATURE OF INSTALLER		DATE	
STREET ADDRESS			CITY	STATE	ZIP CODE

Exhibit 5

State of Delaware
Department of Public Safety
The Boiler Safety Program

REPORT OF INSPECTION

☐ Boiler ☐ Fired Pressure Vessel ☐ Unfired Pressure Vessel

Date Issued Certificate No.

1	Date Inspected Mo. Day Year	Cert. Exp. Date Mo. Year	Certificate Posted ☐ Yes ☐ No	Owner No.	Del. State Number	Nat'l Bld. No. ☐ Other No. #
2	Owner				Nature of Business	Kind of Inspection ☐ Int. ☐ Ext. / Certificate Inspection ☐ Yes ☐ No
	Owner Street Address Number				Owners City	State / Zip
3	Users Name – Object Location				Specific Location in Plant	Object Location County
	Users Street Address Number				Users City	State / Zip
4	Type			Year Built	Manufacturer	
5	Use				Size	Pressure Gage Tested ☐ Yes ☐ No
6	Pressure Allowed This Inspection / Prev. Inspection			Safety Relief Valves Set At	Fuel	Method of Firing
7	Is condition of object such that a certificate may be issued? ☐ Yes ☐ No (If no explain fully under conditions)				Hydro Test ☐ Yes Psi. Date	☐ No
	Annual and/or Biennial Inspection Fee $				Two Year Certificate Fee $	
8	*CONDITIONS:* *With respect to the internal surface, describe and state location of any scale, oil or deposits. Give location and extent of any corrosion and state whether active or inactive. State location and extent of any erosion, grooving, bulging, warping, cracking or similar condition. Report on any defective rivets, bowed, loose or broken stays. State condition of all tubes, tube ends, coils, nipples, etc. Describe any adverse conditions with respect to pressure gage, water column, gage glass, gage cocks, safety valves, etc. Report condition of setting, linings, baffles, supports, etc. Describe any major changes or repairs made since last inspected.*					

9. Requirements: (List code violations)

10. Name and title of person to whom requirements were explained:

I hereby certify this is a true report of my inspection:

Signature of Inspector	Comm. No.	Employed by the Boiler Safety Program, State of Delaware	Territory No.

H -stamped boilers

H/W Heating & H/W Supply

___ Delaware Boiler Number
___ASME Code Stamp
___ National Board Number (except Cast iron)
___ Pressure Gauge –scale not less than 1½ nor more than 3½ times the pressure at which the relief valve is set. ASME Section IV-HG-611
___ Thermometer- shall be easily readable. ASME Section IV-HG-612
___ Stop Valves- Located in the supply & return pipe connections. ASME Section IV-HG-710
___ Feed-water- there shall be a check valve and a stop valve installed in the feed pipe to the boiler. Make-up water shall not be introduced through openings provided for inspection, safety relief valve or gauges. ASME Section IV-HG-705(b),
___ Drain valve with a minimum size of ¾".ASME Section IV-HG-715
___ Relief valve setting, less than or equal to Maximum Allowable Working Pressure. ASME Section IV-HG-400.2

- ⇨ Capacity, having equal to or greater than minimum relieving capacity per nameplate. ASME-HG-701.1
- ⇨ Installed with spindle in vertical position. ASME-HG-701.1
- ⇨ Discharge to safe point of discharge. ASME-HG-701.6
- ⇨ Inlet and outlet shall be full size of relief valve ports. ASME-HG-701.6

___ 2 Temperature Controls-CSD-1, CW-410
(2nd Control was required after 1966)-ASME Section IV
(Manual reset on 2nd control required after 9/1/92)-Delaware Boiler Regulations.
___ Low Water Cut-off with manual reset.CSD-1, CW-130d
the low water cut off can be installed any place above the lowest allowable water level established by the manufacturer. CSD-1, CW-130b
(Testable w/o draining boiler)-CW-130e
(Low Water Cut Out - required for Hot Water Boilers over 400,000 BTU/Hr Input- 1974- ASME Section IV for all after 9/1/92)
___ Relief Valve Setting over 30 PSI, Install Code Built Expansion Tank-ASME Section IV-HG-709.2
___ Means of draining expansion tank, without draining boiler system .ASME Section IV-HG-709.2
___ Remote Electric shutoff switch by boiler room door (Emergency).CSD-1, CE-110a
___ Lockable Switch on or adjacent to boiler.CSD-1, CE-110a
___ Combustion Air CSD-1, CG-260

H Stamped Boilers

Steam Heating

___ Delaware Boiler Number
___ASME Code Stamp
___ National Board Number (except Cast Iron)
___ Pressure Gauge (not less than 30 PSI nor more than 60 PSI) ASME Section IV-HG-602b
___ Water Gauge Glass ASME Section IV –HG-603
___ Stop Valves

- ⇨ Single Steam Boiler-If a stop valve is used in the supply piping of a single steam boiler then one shall be used in the return piping ASME Section IV-HG-710.1
- ⇨ Multiple boilers – A stop valve shall be used in each supply and return connection of two or more boilers connected to a common system. ASME Section IV- HG-710.3

___ Feed-Water There shall be a check valve and a stop valve in the feed pipe to the boiler. Feedwater shall be introduced into a boiler through the return piping system. ASME-Section IV-HG-705a
___ ¾" Drain Valve and Bottom blowoff
(See Table HG-715 Up to 500 LB/HR etc.)
___ Relief Valve Setting, not to exceed 15 psi-ASME Section IV-HG-400.1

- ⇨ Capacity, minimum capacity as governed by the boiler nameplate. ASME Section IV-HG-400.1c
- ⇨ Vertical ASME Section IV-HG-701.1
- ⇨ Discharge to safe point ASME Section IV-HG-701.6
- ⇨ Inlet/outlet full size of RV port ASME Section IV-HG-701.6

___ 2 Pressure Controls - (2nd Control with manual reset) (CSD-1 CW-310.c)
(Pressure controls protected by siphons @ 90 deg to mercury switch plane)CW-310f
(Steam Connections to a single control using nonferrous material shall be not less than ¼" for lengths up to 5 ft. and not less than ½" for lengths over 5 ft.----AND-- for Ferrous materials not less than ½" for lengths up to 5 ft. and not less than 1" for lengths over 5 ft.(CSD-1 CW-310g-h)
(Pressure controls may be manifolded the manifold to the boiler be, for nonferrous materials not less than ½" for length up to 5 ft. and not less than ¾"for lengths over 5 ft, for ferrous materials not less than ¾" for lengths up to 5ft and not less than 1¼" for lengths over 5 ft. Individual controls are to be piped according to g&h above. (CSD-1-CW-301i)
___ 2 Low Water Cut-offs, the lower equipped with manual reset (CSD-1,CW-120)
(2nd Control with manual reset after 9/1/92 connected with CROSS connections not elbows or Tees)
___ Remote Electric shutoff by boiler room door (Emergency) (CSD-1,CE-110a)
___ Lockable Switch on or adjacent to boiler. (CSD-1, CE-110a)
___ Combustion Air-CSD-1, CG-260

H LW H/W Supply
Limited to 210F
Exceeding:
200,000 Btu/Hr or
58,600 Watts

___ DE #
___ASME Code Stamp
___ National Board #
___ Operating Control
___ Hi-Limit Control
___ ¾" Drain Valve
___ Thermometer
___ RV =< MAWP
- ⇨ Capacity
- ⇨ Max. Temperature 210F
- ⇨ Vertical or within 4" of the top
- ⇨ Discharge to safe point
- ⇨ Inlet/outlet full size of RV port

U Unfired Pressure Vessel

___ DE #
___ASME Code Stamp
___ National Board #
___ RV =< MAWP
- ⇨ Capacity
- ⇨ Discharge to safe point
- ⇨ Inlet/outlet full size of RV port

S Power Boiler

___ DE #
___ASME Code Stamp
___ National Board #
___ Pressure Gauge located so easily readable. Dial shall be graduated to approximately double the pressure at which the safety valve is set, but not more than 1½ times this pressure. ASME Section I (PG-60.6.1)
___ Water Gauge Glass ASME Section I (PG-60.)
___ Stop Valve (PG-58) (B31.1, 122.1.7) If two boilers installed in parallel
___ Feed water Valves
___ RV =< MAWP
- ⇨ Capacity
- ⇨ Vertical
- ⇨ Discharge to safe point (blowdown tank required if going to sewer)
- ⇨ Inlet/outlet full size of RV port
- ⇨ Discharge pipe supported

___ 2 Pressure Controls*
(2nd Control with manual reset)
(Pressure controls protected by siphons @ 90 deg to mercury switch plane)
(Min ½ ips to each branch)
___ 2 Low Water Cut-off with manual reset
(2nd Control with manual reset after 9/1/92 connected with CROSS connections not elbows or Tees)
___ Blowoff piping Sch. 80
___ Blowoff Valves (2) 125% Boiler MAWP
___ Main Steam Piping & Valves
___ Remote Electric shutoff by boiler room door (Emergency)
___ Lockable Switch on or adjacent to boiler
___ Blowoff Tank-Outlet (Drain) not less than twice the area of the boiler blowoff piping.
- Vent – at least twice the diameter of the inlet and lead to outside, discharging at least 7 feet above grade.

*1st Inspection
Registration Form (Contractor)
Fuel Train Report (over 400,000 BTU/Hr from Contractor)