DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

Adoption of Chapters 12-221.1, 12-222.1, 12-223.1, 12-224.1, and 12-225.1, Amendments to and Compilation of Chapter 12-220, and Repeal of Chapters 12-221, 12-222, 12-223, 12-224, and 12-225

Hawaii Administrative Rules

(August 13, 2019)

1. Chapter 12-220, Hawaii Administrative Rules, entitled "General, Administrative, and Legal Provisions", is amended and compiled to read as follows:

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILER AND PRESSURE VESSEL

CHAPTER 220

GENERAL, ADMINISTRATIVE, AND LEGAL PROVISIONS

Historical Note: Chapter 220 of title 12 is based upon chapter 377 of the Hawaii Occupational Safety and Health Standards, Rules and Regulations. [Eff 7/11/74; am 6/7/76; am 12/30/76; am 8/22/77; am 8/11/78; am 8/23/79; R 7/12/82]

§12-220-1 Definitions. As used in this part:

"Accident" means any undesired boiler or pressure vessel event that results in personal injury or property damage. This does not include events of a routine nature due to the normal operation of a boiler or pressure vessel such as tube leaks, general leakage from the pressure boundary, corrosion, erosion, or other events that are typically associated with maintenance or repair.

["~~A.I.A.~~"] "AIA" means [~~Authorized Inspection Agency as defined by the National Board in the "Criteria for Acceptance of Authorized Inspection Agencies for New Construction," NB-360, or "Qualifications and Duties for Authorized Inspection Agencies Performing Inservice Inspection Activities and Qualifications for Inspectors of Boilers and Pressure Vessels," NB-369.~~]:

(1) The department of labor and industrial relations boiler and elevator inspection branch; or

(2) An insurance company which has been licensed or registered by the appropriate authority of the State of Hawaii to write boiler and pressure vessel insurance and provides inspection services of boilers and pressure vessels and pressure systems in this State, and whose inspectors hold a valid commission issued by the National Board, and possess a valid State of Hawaii certificate of competency. The insurance company shall be accredited by the National Board in accordance with NB-369, Accreditation of Authorized Inspection Agencies (AIA) Performing Inservice Inspection Activities.

"Alteration" means a change in [~~any~~] the item described on the original [~~Manufacturer's Data Report or specification other than maintenance, repair, or replacement; additional mechanical tests are required.~~] manufacturer's data report that affects the pressure containing capability of the pressure retaining item. Nonphysical 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.

"ANSI" means the American National Standards Institute.

[~~"ASME B31.1" means ASME B31.1-2010, Power Piping.~~

~~"ASME PVHO 1" means ASME PVHO 1-2002, American Society of Mechanical Engineers, Safety Standards for Pressure Vessels for Human Occupancy.~~]

"Appeals board" means the [~~labor and industrial relations appeals board, department of labor and industrial relations.~~] department of labor and industrial relations, labor and industrial relations appeals board.

"API" means the American Petroleum Institute.

"API-510" means the American Petroleum Institute Pressure Vessel Inspection Code: In-service Inspection, Rating, Repair, and Alteration.

"Application" means a written or electronic request for approval required by law to be obtained prior to the installation, operation, or repair or alteration of a [~~boiler, pressure vessel, or pressure system.~~] pressure retaining item.

"Approved" means approved by the department.

"Appurtenance" means a device installed on and used in the normal operation of a boiler or pressure vessel.

[~~"ASME Code" means the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers, 2010 ASME Boiler and Pressure Vessel Code.~~

~~"ASME CSD-1" means controls and safety devices for automatically fired boilers of the American Society of Mechanical Engineers 2006.~~]

"ASME" means the American Society of Mechanical Engineers.

"ASME B31.1" means the American Society of Mechanical Engineers Power Piping, as adopted and incorporated by reference in section 12-220-1.1.

"ASME BPVC" means the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, as adopted and incorporated by reference in section 12-220-1.1.

"ASME CSD-1" means the American Society of Mechanical Engineers Controls and Safety Devices for Automatically Fired Boilers, as adopted and incorporated by reference in section 12-220-1.1.

"ASME PVHO 1" means the American Society of Mechanical Engineers, Safety Standards for Pressure Vessels for Human Occupancy, as adopted and incorporated by reference in section 12-220-1.1.

"ASME PVHO 2" means the American Society of Mechanical Engineers Safety Standard for Pressure Vessels for Human Occupancy: In-Service Guidelines, as adopted and incorporated by reference in section 12-220-1.1.

"Attorney general" means the attorney general of the State of Hawaii or any of the [~~attorney general's deputies.~~] deputy attorneys general.

"Authorized inspection agency" means [~~:~~

~~(1) The department of labor and industrial relations, boiler and elevator inspection branch; or~~

~~(2) An insurance company which has been licensed or registered by the appropriate authority of the State to write boiler and pressure vessel insurance and does write and provide inspection service of boilers and pressure vessels.~~] the same as AIA.

"Boiler" means a closed vessel in which water or other liquid is heated, steam or vapor is generated, steam or vapor is superheated, or any combination thereof, under pressure for use external to itself, by the direct application of [~~heat, and includes fired units for heating or vaporizing liquids other than water where these units are separate from processing systems and complete within themselves:~~] energy from the combustion of fuels, electricity, or solar energy. The term boiler also shall include the apparatus used to generate heat and all controls and safety devices associated with the apparatus or the closed vessel.

[~~(1) "Power boiler" means a boiler in which steam or other vapor is generated at a pressure of more than 15 psig (103 kPa gage) for use external to itself.~~

~~(2) "High-temperature water boiler" means a water or other liquid boiler intended for operation at pressures in excess of 160 psig (1100 kPa gage) or temperatures in excess of 250° F (121° C), or both.~~

~~(3) "Thermal fluid boiler" means a fluid heater intended for heating a fluid to be circulated externally to itself for the purpose of energy transfer.~~

~~(4) "Heating boiler" means a steam or vapor boiler operating at pressures not exceeding 15 psig (103 kPa gage) or a hot water boiler operating at pressures not exceeding 160 psig (1100 kPa gage) or temperatures not exceeding 250° F (121° C) which include steam~~

heating, hot water heating, and hot water supply boilers:

(A) "Steam heating boiler" means a steam boiler for operation at pressures not exceeding 15 psig (103 kPa gage);

(B) "Hot water heating boiler" means a boiler in which no steam is generated, from which hot water is circulated for heating purposes and returned to the boiler, and which operates at a pressure not exceeding 160 psig (1100 kPa gage) or a temperature of 250° F (121° C) or both at or near the boiler outlet;

(C) "Hot water supply boiler" means a boiler completely filled with water that furnishes hot water to be used externally to itself at pressures not exceeding 160 psig (1100 kPa gage) or at temperatures not exceeding 250° F (121° C) at or near the boiler outlet; and

(D) “Pool heater” means a boiler in which no steam is generated, from which hot water is circulated to a swimming pool, hot tub, or spa and returned to the boiler, and which operates at a pressure not exceeding 160 psig (1100 kPa gage) or a temperature not exceeding 250° F (121° C).

(5) "Electric boiler" means a power boiler or heating boiler in which the source of heat is electricity.

(6) "Miniature boiler" means a power boiler or high temperature water boiler which does not exceed any one of these limits:

(A) Sixteen inches (400 mm) inside diameter of shell;

(B) Twenty square feet (1.9 m^2) heating surface (not applicable to electric boilers);

~~(C) Five cubic feet (140 liters) gross volume exclusive of casing and insulation; and~~

~~(D) One hundred psig (700 kPa gage) maximum allowable working pressure.~~

~~(7) "Waste heat boiler or unfired steam boiler" means an unfired pressure vessel or system of unfired pressure vessels intended for operation in excess of 15 psig steam for the purpose of producing and controlling an output of thermal energy.~~

~~(8) "Heat recovery boiler" means a vessel or system of vessels comprised of one or more heat exchanger surfaces used for the recovery of waste heat.~~

~~(9) "Portable boiler" means a boiler which is primarily intended for temporary location and the construction and usage permits it to be readily moved from one location to another.~~]

"Boiler external piping or BEP" means all piping and components connected to a power boiler as defined in ASME B31.1 and ASME BPVC Section I Power Boilers.

"Certificate of competency" means a certificate issued to a person who has passed the examination prescribed by the director.

"Chief boiler inspector" means the appointed chief boiler and pressure vessel inspector in the jurisdiction charged with the enforcement of laws pertaining to the inspection of boilers and pressure vessels. The chief boiler inspector represents the jurisdiction as the voting member of the National Board and serves as an ASME Conference Committee member.

"Commission[~~, National Board~~]" means the commission issued by the National [~~board~~] Board [~~to a holder of a certificate of competency~~].

"Condemned boiler or pressure vessel" means a boiler or pressure vessel that has been inspected and declared unsafe or disqualified by legal requirements by an inspector and a stamping or marking designating its condemnation has been applied by the inspector.

"Contractor" means any person, firm, or corporation installing, repairing, or servicing and responsible for the safe operation of [~~any boiler, pressure vessel, or pressure system, inspected pursuant~~] any pressure retaining item subject to chapter 397, HRS.

"Department" or "DLIR" means the department of labor and industrial relations, State of Hawaii.

"Director" means the director of the department of labor and industrial relations or the director's [~~designee.~~] agent.

"Discrepancy" means the [~~non-conformance~~] nonconformance of an item, unit, or part to [~~codes, standards, rules , or regulations~~] a code, standard, or rule required by part 10 of this subtitle [~~which the owner, user, or contractor could not have had knowledge~~].

"Division" means the Hawaii occupational safety and health division, department of labor and industrial relations[~~, State of Hawaii~~].

"Electric boiler" means a power boiler or heating boiler in which the source of heat is electricity.

"Existing installation" means any boiler or pressure vessel constructed, installed, placed in operation, or contracted for before the effective date of these rules.

"Factor of safety" is the number by which a given permissible force, or load, value can be multiplied before the boiler or pressure vessel reaches its ultimate design strength value.

"Fired" means the application of heat from the combustion of gaseous, liquid, or solid fuels; or from electricity; [~~or from nuclear sources~~] which includes direct or indirect fired[~~:~~] provided that:

(1) "Direct" means the primary application of heat.

(2) "Indirect" means other than the primary application of heat.

"Fuel" means any matter consumed to produce heat.

"Hawaii Revised Statutes" or "HRS" means laws enacted by the Hawaii State Legislature.

"Heat" means thermal energy in transition by radiation, conduction, convection, or any combination of these.

"Heat recovery steam generator" means a vessel or system of vessels comprising one or more heat exchanger surfaces used for the recovery of waste heat. It produces steam that can be used in a process (cogeneration) or used to drive a steam turbine (combined cycle).

"Heating boilers" means steam heating boilers, hot-water heating boilers, hot-water supply boilers, and potable water heaters.

"High-temperature water boiler" means a power boiler in which water is heated and operates at a pressure more than 160 psig or temperatures more than 250 degrees Fahrenheit, and has the ASME Code symbol stamp or ASME certification mark with the designator "S".

"Hot-water heating boiler" means a hot water boiler installed to operate at pressures not exceeding 160 psig or at a temperature not exceeding 250 degrees Fahrenheit, at or near the boiler outlet, and that has the ASME Code symbol stamp or ASME certification mark with the designator "H".

"Hot-water supply boiler" means a boiler that furnishes hot water to be used externally to itself at a pressure not exceeding 160 psig or at a temperature less than or equal to 250 degrees Fahrenheit at or near the boiler outlet, and that has the ASME Code symbol stamp or ASME certification mark with the designator "H".

"Hydrostatic test" means a liquid pressure test which is conducted using water as the test medium.

"Inspector" means a qualified boiler inspector, including the chief boiler inspector, deputy boiler inspector, special inspector, or owner-user inspector holding a valid certificate of competency issued by the department[÷], who has satisfied the requirements established by the department and has a valid National Board commission:

(1) "Chief boiler inspector" means the appointed chief boiler and pressure vessel inspector;

(2) "Deputy boiler inspector" means any boiler inspector [~~appointed by the director and~~] employed by the department;

(3) "Special inspector" means [~~an inspector holding a State of Hawaii, certificate of competency and who is regularly employed by an insurance company authorized to insure boilers or pressure vessels in this State; and~~] any inspector who is regularly employed by an insurance company which has been licensed or registered by the appropriate authority of the State of Hawaii to write boiler and pressure vessel insurance and provide inspection services of pressure retaining items in this State; and

(4) "Owner-user inspector" means an inspector who [~~holds a valid National Board Commission who has passed the examination prescribed by the director and who~~] is [~~continuously~~] regularly employed as an inspector by an owner-user inspection [~~agency.~~] organization.

"Jurisdiction" means [~~a state, commonwealth, county, or municipality of the United States or a province of Canada which has adopted one or more sections of the ASME Code, one of which is Section I, and maintains a duly constituted department, bureau, or division for the purpose of enforcement of this code.~~] the State of Hawaii.

"Lined potable water heater" means a water heater with a corrosion resistant lining used to supply potable hot water.

"May" means permissive.

"Miniature boiler" means a power boiler or high temperature water boiler which does not exceed any one of these limits:

(1) Sixteen inches (16) inside diameter of shell;

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

(3) Five (5) cubic feet gross volume exclusive of casing and insulation; and

(4) One hundred (100) psig maximum allowable working pressure.

"National Board" or "NB" means the National Board of Boiler and Pressure Vessel Inspectors[~~, 1055 Crupper Avenue, Columbus, Ohio 43229, whose membership is comprised of the chief inspectors of jurisdictions who are charged with the enforcement of the provisions of the ASME Code~~].

"National Board Inspection Code" or "NBIC" means the National Board Inspection Code [~~2011.~~] as adopted and incorporated by reference in section 12-220-1.1.

"NB-263, RCI-1" means the National Board Rules for Commissioned Inspectors.

"NB-264" means the National Board Criteria for Registration.

"NB-369" means the National Board Accreditation of Authorized Inspection Agencies (AIA) Performing Inservice Inspection Activities.

"NB-371" means the National Board Accreditation of Owner-User Inspection Organizations (OUIO).

"NB-381" means the National Board Quality Program for Inspection Organizations.

"NBEP" means non-boiler external piping[~~.~~] that refers to all piping and components connected downstream of the boiler external piping as defined in ASME B31.1.

"NBEP certificate" means a certificate issued by the department to a company that is qualified to design, [~~and fabricate the~~] fabricate, install, repair, or alter non-boiler external piping. [~~The certificate limits the design pressure to 150 psi and the pipe size to 3 inches in diameter.~~] A company that applies for a NBEP authorization without a valid ASME certificate of authorization with a "S", "A", or "PP" designator, or a valid NB "R" certificate of authorization, may be issued a certificate limited in scope of work to a MAWP of 150 psi or less, and a pipe size to three (3) inches in diameter or less. The provisions of ASME B31.1 shall apply[~~.~~], including the quality control requirements in Mandatory Appendix J.

"NBIC" means the National Boiler Inspection Code, as adopted and incorporated by reference in section 12-220-1.1.

"New boiler or pressure vessel installation" means all boilers or pressure vessels constructed, installed, placed in operation, or contracted for after the effective date of these [~~standards and codes.~~] rules.

"NFPA" means the National Fire Protection Association.

"NFPA 31" means the National Fire Protection Association Standard for the Installation of Oil-Burning Equipment.

"NFPA 54, ANSI Z223.1" means the National Fire Protection Association National Fuel Gas Code.

"NFPA 58" means the National Fire Protection Association Liquefied Petroleum Gas Code.

"NFPA 70" means the National Fire Protection Association National Electrical Code, as adopted and incorporated by reference in section 12-220-1.1.

"NFPA 85" means the National Fire Protection Association Boiler and Combustion Systems Hazards Code, as adopted and incorporated by reference in section 12-220-1.1.

"Non-code water heater" means a closed vessel in which water is heated by the combustion of fuels or by electricity, or by any other source, and withdrawn for use external to the system and not exceeding the following: 160 psig, volume capacity of less than 120 gallons, or a heat input of 200,000 Btu per hour. It shall include all controls and devices necessary to prevent water temperature from exceeding 210 degrees Fahrenheit.

"Nonstandard [~~boiler or pressure vessel"~~] or non-code" means a [~~boiler or pressure vessel~~] pressure retaining item that does not bear the ASME BPVC symbol[~~.~~] or ASME certification mark with the appropriate designator and National Board stamping.

[~~"Nuclear power plant" means a plant consisting of one or more nuclear power and containment systems.~~

~~"Nuclear power system" means a system which serves the purpose of producing and controlling an output of thermal energy from nuclear fuel and those associated~~

~~systems essential to the functions of the power system; the components of the system include such items as pressure vessels, piping system, pumps, valves, and storage tanks.~~]

"NPS" means nominal pipe size.

"Operating permit" or "certificate of inspection" means a permit issued by the department authorizing the operation of a [~~boiler or pressure vessel or pressure system.~~] pressure retaining item.

"Order" means a command to perform a mandatory act issued by the department.

"Owner" means any person, firm, entity, or corporation with legal title to any [~~boiler, pressure vessel or pressure system, inspected pursuant~~] pressure retaining item subject to chapter 397, HRS, who may or may not be the user.

"Owner-user inspection [~~agency~~] organization" or "OUIO" means an owner or user of [~~boilers, pressure vessels and pressure system who maintains a regularly established inspection department,~~] pressure retaining items, whose organization and inspection procedures meet the requirements of [~~the National Board rules and are acceptable to the department.~~] NB-371, and is acceptable to the jurisdiction.

"[~~Permit-inspection~~] Permit inspection" means an inspection, the report of which is used by the department as justification for issuing, withholding, or revoking the operating permit which includes internal and external inspections.

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

(2) "External inspection" means an inspection made when a boiler or pressure vessel is in operation, when the controls, safety devices, and pressure containing components are examined.

"Pool heater" means a boiler in which no steam is generated, from which hot water is circulated to a swimming pool, hot tub, or spa, and returned to the boiler, and operates at a pressure not exceeding 160 psig, or a temperature not exceeding 250 degrees Fahrenheit.

"Portable boiler" means a boiler that is primarily intended to be conveyable and can be readily moved from one location to another.

"Power boiler" means a boiler in which steam or other vapor is generated at a pressure in excess of fifteen (15) psig for use external to itself and includes fired units for vaporizing liquids other than water, but does not include fired process heaters and systems (see also high-temperature water boiler), and has the ASME Code symbol stamp or ASME certification mark with designators "S", "M", or "E".

"Pressure piping" means piping systems specified in ASME [~~B31.1-2010, Power Piping.~~] B31.1.

"Pressure retaining item" means boiler, pressure vessel, or pressure system.

"Pressure system" means a system composed of unfired pressure vessels and piping components for liquid or vapor distribution at a pressure of more than [~~15~~] fifteen (15) psi or a temperature [~~in excess of~~] more than [~~250° F,~~] 250 degrees Fahrenheit, or both, that includes, but is not limited to, a bank of pressure vessels, including those of a size that does not require permits, and are connected with or without any intervening valves.

"Pressure vessel" means a closed vessel in which the pressure is obtained from an external source, or by the application of heat from either an indirect [~~source,~~] or [~~from a~~] direct source, other than those vessels defined as boilers in this section, which includes fired and unfired pressure vessels.

(1) "Fired pressure vessel" means a closed vessel in which fluid is heated or steam is generated for use within itself by the direct or indirect application of heat.

(2) "Unfired pressure vessel" means a closed vessel in which pressure is obtained from an external source.

"Psi" means pounds per square inch.

"Psig" means pounds per square inch gage.

"Reinstalled boiler or pressure vessel" means a boiler or pressure vessel removed from its original [~~setting~~] site and reinstalled at the same location or at a new location [~~without change of ownership~~].

"Relief valve" means an automatic pressure relieving device, used primarily for liquid service, actuated by the static pressure upstream of the valve [~~which~~] that opens further with the increase in pressure over the opening pressure.

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

"[~~Safety-relief~~] Safety relief valve" means an automatic, pressure-actuated relieving device suitable for use either as a safety valve or relief valve depending on the application.

"Safety valve" means an automatic pressure relieving device, used for gas or vapor service, actuated by the static pressure upstream of the valve, and characterized by full-opening pop action.

"School" means an institution of learning, which includes [~~pre-schools~~] preschools, elementary schools, intermediate or middle schools, [~~and~~] high schools[~~.~~], technical schools, trade schools, and colleges and universities.

"Second-hand boiler or pressure vessel" or "used boiler or pressure vessel" means a boiler or pressure vessel [~~which~~] that has changed both location and ownership since its primary use.

"Shall" means mandatory.

"Standard [~~boiler or pressure vessel~~] pressure retaining item" means a [~~boiler or pressure vessel~~] pressure retaining item which bears both the ASME Code symbol or ASME certification mark and National Board number.

"State special" means any non-code [~~boiler or pressure vessel objects,~~] or nonstandard pressure retaining item, including water heaters and kettles, which contain steam, hot water, or air greater than [~~15~~] fifteen (15) psi, and are located or installed on school property.

"Steam heating boiler" means a steam boiler for operation at pressures not exceeding fifteen (15) psig, and has the ASME Code symbol stamp or ASME certification mark with designator "H".

"Thermal fluid boiler" means a fluid heater intended for heating a fluid for circulation externally to itself for energy transfer.

"Unfired" means the application of pressure or heat that is obtained from an external source.

"User" means any person, firm, entity, or corporation legally in possession and responsible for the safe operation of any [~~boiler, pressure vessel, or pressure system inspected pursuant~~] pressure retaining item subject to chapter 397, HRS.

"Vendor" means any person, firm, entity, or corporation that sells or distributes any [~~boiler, pressure vessel or pressure system required to be inspected pursuant~~] pressure retaining item subject to chapter 397, HRS.

"Violation" means [~~non-conformance~~] nonconformance of an item, unit, or part to codes, standards, or rules[~~, or regulations~~] required by this subtitle.

[~~"Water heater" means a closed vessel in which water is heated by the combustion of fuels or by electricity, or by any other source, and withdrawn for use external to the system at pressure not exceeding 160 psig (1100 kPa gage), or a heat input of 200,000 btu per hour, and shall include all controls and devices necessary to prevent water temperature from exceeding 210° F (99° C).~~]

"Welding documentation" means the welding procedure specifications, procedure qualification records, records of welder or welding operator performance qualification, welder's continuity log, and reports of welded repairs or alterations.

[Eff 12/6/82; am 12/19/83; am 12/8/86; am and comp 12/6/90; am 7/6/98; am 6/19/00; am 11/18/12; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-1.1 Codes incorporated and adopted by reference. The following codes are adopted by reference and made a part of this chapter and shall apply to all pressure retaining items in this part, unless otherwise modified by rules pertaining to pressure retaining items:

(1) ASME B31.1-2016, Power Piping Code, as published by the American Society of Mechanical Engineers;

(2) ASME BPVC-2017, Boiler and Pressure Vessel Code, as published by the American Society of Mechanical Engineers;

(3) ASME CSD-1-2012, Controls and Safety Devices for Automatically Fired Boilers, as published by the American Society of Mechanical Engineers;

(4) ASME PVHO 1-2012, Safety Standards for Pressure Vessels for Human Occupancy, as published by the American Society of Mechanical Engineers;

(5) ASME PVHO 2-2012, Safety Standard for Pressure Vessels for Human Occupancy: In-Service Guidelines, as published by the American Society of Mechanical Engineers;

(6) NBIC 2017 edition, National Board Inspection Code, as published by the National Board of Boiler and Pressure Vessel Inspectors;

(7) NFPA 70, National Electrical Code, 2002 edition, as published by the National Fire Protection Association; and

(8) NFPA 85, National Fire Protection Association Boiler and Combustion Systems Hazards Code, 2015 edition, as published by the National Fire Protection Association.

[Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-2 Minimum construction standards. (a) All new boilers and pressure vessels, unless otherwise exempt, [~~to be operated~~] for operation in Hawaii, shall be designed, constructed, [~~inspected,~~] and [~~stamped~~] marked[~~, and installed~~] in accordance with the ASME [~~code~~] BPVC, [~~and the latest addenda and these Standards.~~] including Code Cases, and registered with the National Board in accordance with NB-264. Pressure vessels for human occupancy must meet these requirements [~~plus complying~~] and comply with [~~ANSI/ASME PVHO 1.~~] ASME PVHO 1 and 2. [~~Boilers and pressure vessels for which an ASME manufacturers' data report is required shall bear the manufacturers' NB number as registered with the National Board.~~] A copy of the [~~manufacturers'~~] manufacturer's data report [~~signed by the manufacturer's representative and the National Board's inspector,~~] shall be filed with the department.

(b) If a boiler or pressure vessel [~~cannot~~] does not bear the ASME and National Board stamping, details [~~in the English language and~~] written in the English language, and United States customary units of the proposed construction, material specifications, and calculations, approved by a licensed or registered professional engineer experienced in boiler and pressure vessel design, shall be submitted to the department by the owner[~~,~~] or user[~~, and manufacturer~~] for approval as [~~"State special"~~] a nonstandard, non-code or State special before construction and installation is started. [Eff 12/9/82; am; ren §12-220-2, and comp 12/6/90; am 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-220-3 Restamping boilers and pressure**~~

~~**vessels.** When the stamping on a boiler or pressure vessel becomes indistinct, the inspector shall instruct the owner or user to have it restamped. Request for permission to restamp the boiler or pressure vessel shall be made to the department, and proof of the original stamping shall accompany the request. This stamping shall be in accordance with the National Board Inspection Code.~~] [Eff 12/6/82; am and ren §12-220-3 and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-2.1 Requirements for new installations. (a) New installations shall comply with the technical requirements contained in chapters 12-222.1 through 12-225.1 and require the submission of an application on a form prescribed by the department for an installation permit prior to the commencement of work. A complete application shall include:

(1) Date of application, project name, and address;
(2) Installers' name, address, and installers' type of license held along with the expiration date;
(3) Contact person and phone number for both the owner and the installer;
(4) National Board number for each pressure retaining item to be installed;
(5) Copy of the ASME manufacturer's data report;
(6) Floor plan layout with clearance dimensions; and
(7) Piping and instrumentation diagram.

(b) Applications for new installations must be accompanied by the remittance of the appropriate installation fee for each pressure retaining item subject to this part as per the schedule in Exhibit A, titled, "Installation, Repair or Alteration Permit Fees, and Licensure, Examination, and Registration Fees", dated September 1, 2019, which is made part of this chapter and located at the end of this chapter.

(c) No pressure retaining item shall be issued a permit to operate in the State unless it has been constructed in conformity with the ASME BPVC, registered with the National Board, and installed in conformity with this chapter except:

(1) Those pressure retaining items exempt from chapter 397, HRS;

(2) Those pressure retaining items outlined in section 12-220-2(b);

(3) Pressure retaining items under federal inspection and control;

(4) Unfired pressure vessels meeting the requirements of the United States Department of Transportation, and used for transporting liquids or gases under pressure;

(5) Unfired pressure vessels with a nominal water-containing capacity of 120 gallons or less for containing liquid under pressure, including those containing air, the compression of which serves only as a cushion;

(6) Hot-water supply boilers, hot-water heating boilers, and potable water heaters that are directly fired with oil, gas, or electricity, except that hot-water supply boilers shall be equipped with a proper size, type, and capacity safety relief valve as set forth in section IV of the ASME BPVC, when none of the following limitations are exceeded:

(A) A heat input of 200,000 Btu per hour;

(B) A water temperature of 210 degrees Fahrenheit;

(C) A nominal water-containing capacity of 120 gallons; and

(D) An operating pressure not exceeding 160 psi;

(7) Unfired pressure vessels designed for a pressure not exceeding fifteen (15) psi or five (5) cubic feet in volume;

(8) Pressure vessels not exceeding:

(A) Five (5) cubic feet in volume and 250 psi design pressure;

(B) Three (3) cubic feet in volume and 350 psi design pressure;
(C) One and one-half (1.5) cubic feet in volume and 600 psi design pressure; or
(D) An inside diameter of six (6) inches with no limitation on pressure;

(9) Unfired pressure vessels containing water and filtering material for use in irrigation of land;

(10) Unfired pressure vessels for the storage of cold water;

(11) Fired or self-contained sterilizers, steam generators, jacketed kettles, or steam cookers when one of the following limitations is not exceeded:
(A) Heat input of three (3.0) KW; or
(B) A volume of one and one half (1.5) cubic feet;

(12) Unfired pressure vessels and piping containing liquid petroleum gas and liquid natural gas (except that welded repairs and alterations shall be in accordance with section 12-220-8.1);

(13) Refrigeration pressure vessels and its associated piping (except that welded repairs and alterations shall be in accordance with section 12-220-8.1);

(14) Liquid carbon dioxide pressure vessels (except that welded repairs and alterations shall be in accordance with section 12-220-8.1);

(15) A hot water heater constructed of continuous coils, which is used only to produce steam vapor to clean machinery, equipment, and buildings, if:
(A) The tubing or pipe size does not exceed three-fourths (3/4) of an inch in diameter and drums and headers are not attached;
(B) The nominal water-containing capacity does not exceed six (6) gallons;

(C) The water temperatures do not exceed 350 degrees Fahrenheit; and

(D) Steam is not generated within the coil; and

(16) Pressure vessels containing water heated by steam or any other indirect means when none of the following limitations are exceeded:

(A) A heat input of 200,000 Btu per hour; and

(B) A water temperature of 210 Fahrenheit provided such pressure vessels shall be equipped with an ASME-NB stamped safety relief valve.

(d) The marking done in accordance with the original code of construction and section 12-220-29.1 shall not be concealed by lagging or paint and shall be exposed unless a suitable record is kept of the location of the stamping so that it may be readily uncovered at any time. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

Historical note: §12-220-2.1 is based substantially upon §12-220-11. [Eff 12/6/82; am 12/8/86; am and ren §12-220-11 and comp 12/6/90; am 7/6/98; am 6/19/00; am 11/18/12; R]

§12-220-4 Restrictions on nonstandard [~~boilers or pressure vessels.~~] pressure retaining items. The installation, operation, sale, or the offering for sale of nonstandard [~~boilers or pressure vessels~~] pressure retaining items in Hawaii is prohibited without the expressed written permission of the department[~~. Refer~~] (refer to section ~~12-220-32.~~] 12-220-32.1). [Eff 12/6/82; am 12/8/86; am, and ren §12-220-4, and comp 12/6/90; am 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-5 Installation of used [~~boilers or pressure vessels.~~] pressure retaining items. Used or second-hand [~~boilers and pressure vessels, ~~] pressure retaining items, when installed in this jurisdiction, shall require the owner to provide in-service inspection reports for at least the last five years and copy of any report of repairs and alterations. These pressure retaining items shall be equipped with fittings and appurtenances that comply with the requirements for new installations. [Eff 12/6/82; am, ren §12-220-5, and comp 12/6/90; am 7/6/98; am and comp] (Auth: ·HRS §§397-4, 397-6) (Imp: HRS §§397-4, 397-6)

§12-220-6 [~~Reinstalled boiler or pressure vessel.~~] Re-installed pressure retaining items. [~~When a stationary boiler or pressure vessel is moved and reinstalled, the attached fittings and appurtenances shall comply with the requirements for new installations.~~] (a) If a pressure retaining item is removed from its original site and is to be re-installed at the same location, or at a new location, the contractor, user, or owner must apply to the department for a permit for installation before re-installing the pressure retaining item. The fittings and appurtenances must comply with the requirements for the installation of a new pressure retaining item.

(b) If a standard pressure retaining item is to be moved to another state for temporary use or repair, the owner of the pressure retaining item or his or her agent must apply to the department for approval to re-install the pressure retaining item within this State. [Eff 12/6/82; am, ren §12-220-6, and comp 12/6/90; am 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-7 Working pressure for existing installations. Subject to approval by the department,

[~~Any~~] any inspector may decrease the working pressure on any existing installation if the condition of the [~~boiler or pressure vessel~~] pressure retaining item warrants. If the owner or user does not concur with the·inspector's decision, the owner or user may appeal to the director [~~as outlined in~~] pursuant to section [~~12-220-23~~] 12-220-33.1. [Eff 12/6/82; am, ren §12-220-7, and comp 12/6/90; am 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-220-8 Repairs and alterations.** (a) When repairs and alterations are to be made, the requirements of the National Board Inspection Code shall apply. Applications for authorization for repair/alteration shall be filed in the prescribed form along with the applicable fee per section 12-220-35 table 220-1 with the department prior to commencement of work. A complete application shall include name of the applicant, address, telephone number, "R" stamp number and expiration date. A copy of the manufacturer's data report form shall be submitted along with drawings of the proposed alteration, calculations, materials, procedures, new maximum allowable working pressure and temperature. The type of equipment shall be identified with pertinent information such as, power boiler, heating boiler or pressure vessel number, National Board number, name of manufacturer and year built. Incomplete, illegible or applications with insufficient data shall not be considered for approval.~~

~~(b) It is a requirement of the department that the holder of a National Board Repair Symbol shall have in force at all times a valid inspection contract or agreement with an authorized inspection agency that employs authorized inspectors as defined in the National Board Inspection Code Part 3.~~

~~(c) It shall be the responsibility of the organization making the repair or alteration to provide for inspection, documentation, and certification of the~~

~~work. The inspection agency responsible for inservice inspection of the boiler or pressure vessel shall have access to review the repair procedures.~~

~~(d) The R-1, R-2, R-3 or R-4 form, as applicable, shall be submitted to the department as soon as possible, following the completion of the repairs or alterations but no later than thirty days. The drawings, design-calculations, NDE records, the checklists and other pertinent documents shall be kept for a period of five years.~~

~~(e) When repairs, alterations or installations of nonboiler external piping are to be made, an ASME or the National Board stamps are not mandatory. An applicant whose quality control program has been approved and who has been issued an NBEP certificate by the department may be eligible to conduct such activity.~~

~~(f) Prior to commencement of repairs, alterations or installations of non-boiler external piping the holder of the NBEP certificate shall submit an application on the prescribed form along with the necessary fee per section 12-220-35, table 220-1, for authorization to conduct such activity.~~] [Eff 12/6/82; am 12/8/86; am and ren §12-220-8 and comp 12/6/90; am 7/6/98; am 6/19/00; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-8.1 Repairs and alterations. (a) Repairs, routine repairs, and alterations to pressure retaining items shall be in accordance with the requirements of the NBIC, Part 3, and this part. Applications for authorization for routine repair, repair, or alteration shall be submitted in the prescribed form and must be accompanied by the remittance of the appropriate fee for each pressure retaining item subject to this part as per the schedule in Exhibit A, titled, "Installation, Repair or Alteration Permit Fees, and Licensure, Examination, and Registration Fees", dated September 1, 2019, which is

made part of this chapter and located at the end of this chapter, and inspection fee for each pressure retaining item subject to this part as per the schedule in Exhibit B, titled, "Internal & External Inspection Fees", dated September 1, 2019, which is made a part of this chapter and located at the end of this chapter. The applicant shall submit all the required documents and remittance fees to the department prior to commencement of work. A complete application shall include the name of the applicant, address, telephone number, NB "R" certificate of authorization number and expiration date, AIA of record, and name of the commissioned repair inspector.

(b) No pressure retaining item subject to this part shall be repaired or altered in the State unless:

(1) For routine repairs, in addition to the requirements of subsection (a), a copy of the manufacturer's data report and all partial data reports shall be submitted along with a detailed description of the proposed routine repair, drawings or pictures, material specifications, and a copy of the traveler or routine repair procedure to be used;

(2) For repairs, in addition to the requirements of subsection (a), a copy of the manufacturer's data report and all partial data reports shall be submitted along with a detailed description of the proposed repair, drawings or pictures, design calculations (if available), material specifications, and a copy of the traveler or repair procedure to be used; and

(3) For alterations, in addition to the requirements of subsection (a), a copy of the manufacturer's data report and all partial data reports shall be submitted along with a detailed description of the proposed alteration, drawings or pictures, design calculations, material specifications, and a copy of the traveler or alteration procedure to be used, and when applicable, a new

maximum allowable working pressure and temperature of the pressure retaining item.

(c) It shall be the responsibility of the holder of a National Board "R" certificate of authorization making the routine repair, repair, or alteration to have a valid inspection contract or agreement in force at all times with an AIA that employs qualified boiler inspectors in compliance with NB-263, RCI-1 Rules for Commissioned Inspectors, and this part.

(d) It shall be the responsibility of the holder of a NB "R" certificate of authorization making the routine repair, repair, or alteration to provide for inspection, documentation, and certification of the work. A fully executed National Board "R" form shall be submitted to the department within thirty (30) days following the completion of the routine repairs, repairs, or alterations. Drawings or pictures, design calculations, non-destructive examination records, and traveler and other pertinent documents shall be maintained by the NB "R" certificate holder for five (5) years. The inspection agency responsible for the in-service inspection of the boiler or pressure vessel shall have access to review the fully executed National Board "R" form and other pertinent documents. [Eff and comp] (Auth: §397-4) (Imp: §397-4)

Historical note: §12-220-8.1 is based substantially upon §12-220-8. [Eff 12/6/82; am 12/8/86; am and ren §12-220-8 and comp 12/6/90; am 7/6/98; am 6/19/00; am 11/18/12; R]

[~~**§12-220-9** Riveted patches. In applying riveted patches, the design of the patch and method of installation shall be in accordance with the National Board Inspection Code, 1973 edition.~~] ·[Eff 12/6/82; ren §12-220-9 and comp 12/6/90; R] (Auth: HRS § 397-4) (Imp: HRS §397-4)

§12-220-9.1 Design, construction, fabrication installation, repair, or alteration of boiler external and non-boiler external piping. (a) Application for authorization for installation of boiler external piping shall be submitted to the department prior to the commencement of work. An application shall be submitted in the form prescribed by the director and must be accompanied by the remittance of the fee for each boiler external piping subject to this part as per the schedule in Exhibit A, titled, "Installation, Repair or Alteration Permit Fees, and Licensure, Examination, and Registration Fees", dated September 1, 2019, which is made part of this chapter and located at the end of this chapter, and inspection fee for each pressure retaining item subject to this part as per the schedule in Exhibit B, titled, "Internal & External Inspection Fees", dated September 1, 2019, which is made a part of this chapter and located at the end of this chapter. A complete application shall include:

(1) Date of application, project name, and address;

(2) Manufacturer's and installer's name, address, and installer's type of license held along with the expiration date;

(3) Contact person and phone number for the owner, manufacturer, and installer;

(4) National Board number of the boiler where the piping is to be installed;

(5) Copy of the ASME manufacturer's data report and partial data reports;

(6) Floor plan layout with clearance dimensions; and

(7) Piping and instrumentation diagram.

(b) Application for authorization for design, fabrication, installation, repair, or alteration of non-boiler external piping shall be submitted by a holder of a valid ASME certificate of authorization with "S", "A", or "PP" designator, a NB "R" authorization, or a NBEP Hawaii certification of authorization, to the department prior to the commencement of work. An application shall be submitted on a form provided by the department and must be

accompanied by the remittance of the fee for each non-boiler external piping subject to this part as per the schedule in Exhibit A, titled, "Installation, Repair or Alteration Permit Fees, and Licensure, Examination, and Registration Fees", dated September 1, 2019, which is made part of this chapter and located at the end of this chapter, and inspection fee for each pressure retaining item subject to this part as per the schedule in Exhibit B, titled, "Internal & External Inspection Fees", dated September 1, 2019, which is made a part of this chapter and located at the end of this chapter. A complete application shall include:

(1) Date of application, project name, and address;

(2) Manufacturer's and installer's name, address, and installer's type of license held along with the expiration date;

(3) Contact person and phone number for the owner, manufacturer, and installer;

(4) National Board number of the boiler where the piping is to be installed;

(5) Copy of the ASME manufacturer's data report;

(6) Floor plan layout with clearance dimensions; and

(7) Piping and instrumentation diagram.

(c) Repairs and alterations of NBEP shall be in accordance with NBIC Part 3 and ASME B31.1 whenever applicable. Repair inspector involvement may be waived, and stamping is not mandatory. [Eff and comp] (Auth: §397-4) (Imp: §397-4)

§12-220-10 [~~Safety appliances.~~] Pressure relief devices. (a) No person shall attempt to remove or do any repair or modification on any [~~safety appliance~~] pressure relief device prescribed by these rules while the [~~appliance~~] device is subject to pressure.

(b) Should any of these [~~appliances~~] pressure relief devices be removed for repair during an outage of a boiler or pressure vessel, they must be

[~~installed~~] re-installed and in proper working order before the object is [~~again~~] placed in service.

(c) No person shall alter any safety or safety-relief valves or pressure relief devices in any manner to maintain a working pressure in excess of that stated on the [~~boiler or pressure vessel~~] pressure retaining item operating permit.

(d) Repair of safety valves shall be made only by an organization which holds a valid certificate of authorization for use of the National Board "VR" safety valve repair symbol stamp. [~~A variance may be granted to the requirement for the National Board "VR" safety valve repair symbol stamp provided the following requirements are met:~~

~~(1) The repair organization shall have a written quality control system as described in the National Board Inspection Code Part RA.~~

~~(2) A written application for consideration shall be made to the department. The application for consideration shall contain, in sufficient detail, the:~~

~~(A) Types of safety valves repaired;~~

~~(B) Repair procedures followed for each type of valve;~~

~~(C) Documentation of parts or materials utilized, which shall be original manufactured parts or equivalent;~~

~~(D) Nature of the training program utilized to qualify repairers; and~~

~~(E) Report from an inspector qualified by the jurisdiction relative to the competency of the organization to perform these repairs.~~

~~(3) Work performed shall be to return the valve to "like new" condition. Capacity, pressure, or blowdown setting of the valve shall not be changed.~~

~~(4) Any inspector shall notify the department if the approved standards are not maintained. The department shall review the terms of the variance for compliance.~~

~~(5) Repair of ASME section IV safety valves as applied for section IV service, shall not be permitted except by the manufacturer.~~

~~(6) Training and qualifications of personnel shall meet the requirements of the National Board Inspection Code Part RA.~~]

(e) Where a valve has been tested and adjusted to restore the set pressure shown on the unmodified original nameplate or stamping, or repair nameplate but not otherwise repaired, a "Test Only" nameplate shall be applied. [Eff 12/6/82; am 12/8/86; am, ren §12-220-10, and comp 12/6/90; am 7/6/98; am 6/19/00; am and comp] (Auth: §397-4) (Imp: §397-4)

§12-220-10.1 Re-stamping or replacement of nameplate of pressure retaining items. When the stamping on a pressure retaining item becomes indistinct or the nameplate is lost, illegible, or detached, but traceability to the original pressure retaining item is still possible, the inspector shall instruct the owner or user to have the stamped data replaced, following the requirements of the original code of construction, except as modified herein. An application to re-stamp or replace nameplates shall be made to the department using the National Board Replacement of Stamped Data Form (NB-136), and must be accompanied by proof of the original stamping and other such data, as is available, and the remittance of the appropriate fee for each pressure retaining item subject to this part as per the schedule in Exhibit A, titled, "Installation, Repair or Alteration Permit Fees, and Licensure, Examination, and Registration Fees", dated September 1, 2019, which is made part of this chapter and located at the end of this chapter, and inspection fee for each pressure retaining item subject to this part as per the schedule in Exhibit B, titled, "Internal & External Inspection Fees", dated September 1, 2019, which is made a part of this chapter and located at the end of this chapter. Additional fees may apply if the department is requested to witness the

attachment of the replacement nameplate. When that traceability cannot be established, the department shall be contacted. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

Historical note: §12-220-10.1 is based substantially upon §12-220-3. [Eff 12/6/82; am and ren §12-220-3 and comp 12/6/90; R]

[~~**§12-220-11 Requirements for new installations.** (a) The new installations shall require filing of an application for installation permit prior to the commencement of work. A complete application shall include date of application, project name and address besides name and address of installer, type of license held and expiration date. The contact person and phone number shall be specified. The applicable fees per section 12-220-35, Table 220-1, also indicated on the application form, shall accompany the request. The National Board number shall be filled in appropriately for each vessel to be installed. If the National Board number is missing from the name plate the department shall be notified for assistance and corrective measure. No boiler or pressure vessel shall hereafter be installed in the State unless it has been constructed in conformity with the ASME Code, registered with the National Board, and installed in conformity with this chapter except:~~

- ~~(1) Those exempt by chapter 397, HRS;~~
- ~~(2) Those outlined in section 12-220-2 (b);~~
- ~~(3) Boilers and pressure vessels under federal inspection and control;~~
- ~~(4) Unfired pressure vessels meeting the requirements of the United States Department of Transportation and used for transporting liquids or gases under pressure;~~
- ~~(5) Unfired pressure vessels with a nominal water containing capacity of 120 gallons or less for~~

containing liquid under pressure, including those containing air, the compression of which serves only as a cushion;

(6) Hot water supply boilers and hot water heating boilers which are directly fired with oil, gas., or electricity when none of these limitations are exceeded:

(A) A heat input of 200,000 Btu per hour;

(B) A water temperature of 210°F; and

(C) A nominal water containing capacity of 120 gallons except that ho~ water supply boilers shall be equipped with a proper size, type, and capacity safety-relief valve as set forth in section IV of the ASME Code;

(D) An operating pressure not exceeding 160 PSI.

(7) Unfired pressure vessels designed for a pressure not exceeding 15 psi;

(8) Pressure vessels not exceeding:

(A) Five cubic feet in volume and 250 psi design pressure;

(B) Three cubic feet in volume and 350 psi design pressure;

(C) One and one-half cubic feet in volume and 600 psi design pressure; or

(D) An inside diameter of 6 inches with no limitation on pressure;

(9) Containers for storage of liquified compressed flammable gases under the jurisdiction of other agencies;

(10) Unfired pressure vessels containing water and filtering material for use in irrigation of land;

(11) Unfired pressure vessels for the storage of cold water;

(12) Electrically heated sterilizers or steam cookers when neither of these limitations is exceeded:

(A) Heat input of 3.0 KW; or

(B) A volume of 1.5 cubic feet.

~~(b) The stamping done in accordance with section 12-220-31 shall not be concealed by lagging or paint and shall be exposed at all times unless a suitable record is kept of the location of the stamping so that it may be readily uncovered at any time.~~] [Eff 12/6/82; am 12/8/86; am and ren §12-220-11 and comp 12/6/90; am 7/6/98; am 6/19/00; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-12 Care of [~~boiler and pressure vessel spaces.~~] pressure retaining item spaces. (a) The [~~boiler and pressure vessel spaces~~] pressure retaining item space shall be free from accumulation of rubbish and materials that may obstruct access to the [~~boiler, pressure vessel,~~] pressure retaining item, or appurtenance. The clearances identical to those required for new installations under section [~~12-220-11~~] 12-220-2.1 shall always be maintained [~~at all times~~] for all types of pressure retaining items.

[~~(b) The storage of flammable material or fuel-powered equipment in the boiler room is prohibited.~~]

(b) Users shall ensure that the following conditions always exist with regards to pressure retaining item spaces:

(1) The storage of flammable materials or fuel-powered equipment is prohibited;

(2) The roof over indoor installations is free from leaks and maintained in good condition;

(3) Adequate floor drainage exists; and

(4) All exit doors open outwards.

[Eff 12/19/84; ren and comp 12/6/90; am 11/18/12, am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-13 Conditions not treated in this part. For any conditions not treated in this part, the

applicable provisions of the ASME [~~Boiler and Pressure Vessel Code,~~] BPVC, ASME B31.1, ASME CSD-1, ASME PVHO 1, ASME PVHO 2, and the [~~National Board Inspection Code~~] NBIC, and other publications adopted herein shall apply. [~~The American Petroleum Institute Pressure Vessels Inspection Code,~~] API-510[~~,~~] shall not take precedence over the safety standards of this part or any reference codes. However, variances may be granted in accordance with section [~~12-220-34.~~] 12-220-33.1. [Eff 12/6/82; am 12/8/86; am, ren §12-220-11, and comp 12/6/90; 7/6/98; 6/19/00; am 11/18/12; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-14 Complaints. (a) Complaints may be made to the department, and where reasonable grounds exist for the department to believe there may be a hazard, there shall be an inspection in response to the complaint.

(b) Names of all complainants and witnesses shall be held in confidence by the department, unless prior permission has been given by the complainant or witness to release his or her name, or unless it has been determined by the attorney general that disclosure is necessary for enforcement and review of this chapter. [Eff 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-15 Permits. (a) An installation permit shall be issued by the department based on the approval of drawings and specifications pertaining to the installation of [~~boilers, pressure vessels or pressure system.~~] pressure retaining items. [~~Operating permits shall be issued on the basis of the report of the acceptance inspection and each permit inspection.~~] An application shall be submitted in the prescribed form and must be accompanied by the remittance fee for each pressure retaining item subject

to this part as per the schedule in Exhibit A, titled, "Installation, Repair or Alteration Permit Fees, and Licensure, Examination, and Registration Fees", dated September 1, 2019, which is made part of this chapter, and located at the end of this chapter, and inspection fee for each boiler, pressure vessel, or pressure system subject to this part as per the schedule in Exhibit B, titled, "Internal & External Inspection Fees", dated September 1, 2019, which is made a part of this chapter and located at the end of this chapter.

The contractor shall be responsible for furnishing to the department all documentation required and referenced in the standards and codes adopted by the department for installation, construction, routine repair, repair, or alteration of any pressure retaining item, NBEP, and BEP.

(b) No person shall install, construct, reconstruct, or relocate any [~~boiler, pressure vessel, or pressure system~~] pressure retaining item without first obtaining an installation permit from the department.

(1) The plans and specifications for installation of [~~boilers, pressure vessels, or pressure systems~~] pressure retaining items together with [~~such details as are~~] pertinent details [~~to the installation~~] shall be submitted to the department [~~before any work is begun on the installation.~~] prior to commencement of work. Plans shall be resubmitted for any project [~~on~~] in which the installation has not commenced within three years of the plan approval date. Copies of engineering data, tests, manufacturer's data reports, [~~and~~] laboratory reports, and any other pertinent information deemed necessary by the department shall be submitted by the installer on any new equipment or appurtenance to be installed for the first time in the State of Hawaii[~~.~~]; and

(2) An installation permit as required under subsection (a) shall be issued only to a

person who is licensed to engage in the business of installing or repairing [~~boilers, pressure vessels, or pressure systems~~] pressure retaining items by the contractors license board of the department of commerce and consumer affairs, State of Hawaii. All installation permit applications shall be deemed approved if not acted upon by the department within thirty calendar days from the date of receipt of the completed application.

[~~(A) All repairs and alterations performed on boilers, pressure vessels, pressure systems, and boiler external piping shall be reported to the department within thirty calendar days.~~

~~(B) The contractor authorized by the department shall be responsible for furnishing to the department all documentation required and referenced in the standards and codes adopted by the department for construction, repair, or alteration of any boiler, pressure vessel, or pressure system.~~

~~(3) The department shall, before issuance of a permit for installing, constructing, reconstructing, or relocating as required under subsection (a) above, charge and collect a fee for each permit in accordance with the schedule in tables 220-1 and 220-2 in section 12-220-35.~~]

(c) Permits for repairs, routine repairs, or alterations shall be issued upon the approval of code routine repair, repair, or alteration application submitted by the holder of NB "R" certificate of authorization. An application shall be submitted in the prescribed form and must be accompanied by the remittance of the fee for each pressure retaining item subject to this part as per the schedule in Exhibit A, titled, "Installation, Repair or Alteration Permit Fees, and Licensure, Examination, and Registration Fees", dated September 1, 2019, which is made part of

this chapter and located at the end of this chapter provided that:

(1) NBEP repair or alteration permits shall be issued upon approval of NBEP repair or alteration application submitted by the holder of an NBEP or ASME "S", "A", "PP", or NB "R" certificate of authorization; and

(2) The department shall issue an NBEP repair or alteration permit to a holder of an NBEP or ASME "S", "A", "PP", or NB "R" certificate of authorization in accordance with section 12-220-9.1.

(d) Permits to operate or certificates of inspection shall be issued based on the report of the acceptance inspection and each permit renewal inspection.

[~~(c)~~](e) The department shall issue a [~~"permit to operate"~~] permit to operate for any [~~boiler, pressure vessel, or pressure system~~] pressure retaining item required by these rules and inspected by an inspector [~~employed by the department~~] and found to be safe and in compliance with this subtitle. The owner or user shall remit upon application an inspection fee for each pressure retaining item subject to this part as per the schedule in Exhibit B, titled, "Internal & External Inspection Fees", dated September 1, 2019, which is made a part of this chapter and located at the end of this chapter. It shall be unlawful for any person, firm, association, partnership, or corporation to operate a [~~boiler, pressure vessel, or pressure system~~] pressure retaining item regulated by this chapter unless a permit for the operation has been authorized by the department and the permit remains in effect[~~.~~] provided that:

(1) A permit to operate a [~~boiler, pressure vessel, or pressure system~~] pressure retaining item shall be issued to the owner or lessee only after an inspector has found that the device has met all requirements of this chapter[~~.~~];

(2) A valid permit may be extended for cause by the department if so requested in writing by the owner or lessee[~~.~~] to the chief boiler inspector. The absence of a special inspector to conduct a permit renewal inspection shall not be accepted as a valid reason for granting the permit extension;

(3) The permit to operate shall indicate the type of equipment for which it is issued[~~.~~], [~~These permits shall also indicate~~] the maximum allowable working pressure, and the [~~national board~~] National Board number. The permit to operate shall be posted in a conspicuous location[~~.~~] nearby the unit;

(4) The department may immediately revoke any [~~"permit to operate"~~] permit to operate or certificate of inspection for any [~~equipment,~~] pressure retaining item, required to be inspected by this chapter, found to be in an unsafe condition, or is not properly guarded or is dangerously placed, or when a user, owner, or contractor [~~ignores~~] fails to comply with department orders to correct specific defects or hazards and continues to use or operate the [~~above mentioned apparatus~~] pressure retaining item [~~without abating the hazards or defects.~~];

(5) The department shall [~~re-issue~~] reissue a [~~"permit to operate"~~] permit to operate to any user, owner, or contractor who demonstrates good faith in [~~proceeding~~] attempting to abate all nonconforming conditions specified in department orders provided the [~~boilers, pressure vessels, or pressure systems are~~] pressure retaining item is safe to operate[~~.~~];

(6) A [~~"permit to operate"~~] permit to operate or certificate of inspection shall be valid only at the location for which it was issued except for boilers or pressure vessels

which are indicated on the permit as being portable[~~.~~];

(7) No [~~boiler, pressure vessel, or pressure system which~~] pressure retaining item that is required to be inspected by chapter 397, HRS, or by any rule adopted pursuant to chapter 91, HRS, shall be operated except as necessary to install, repair, or test, unless a permit to operate or certificate of inspection has been authorized or issued by the department and remains valid[~~.Boilers not in use for a period of one year or more, for any reason, shall be inspected internally and externally before being placed into operation.~~]; and

(8) The department may, upon the application of any owner or user or any other person affected thereby, grant a reasonable period [~~of time~~] as may be necessary, but not longer than ninety days, for compliance with any order[~~.~~] to render the pressure retaining item safe. Any person affected by an order may for cause petition the department for an extension of time[~~.~~] to render the pressure retaining item safe.

[~~(d) The department shall issue a repair or alteration permit only to holders of a current R certificate of authorization from the National Board or holders of a current NBEP certificate of authorization from the department and subject to compliance with section 12-220-8. All applications for alteration and repair permits shall be deemed approved if not acted upon by the department within fifteen calendar days from the date of the receipt of application.~~] [Eff 12/6/82; am 12/8/86; am, ren §12-220-15, and comp 12/6/90; am 7/6/98; am 6/19/00; am 11/18/12; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-16 Inspections and tests. (a) The department shall inspect to insure compliance with chapter 397, HRS, any activity related to the erection, construction, alteration, repair, or maintenance of facilities containing [~~boilers, pressure vessels, or pressure systems.~~] pressure retaining items. The department may authorize special inspectors in the employ of insurance companies who shall inspect boilers and pressure vessels insured by the insurance companies. All equipment required by this section to be inspected [~~is~~] are exempt from the requirements of this chapter[~~,~~] if under the jurisdiction of the United States government, or if serving only a private residence and not accessible to the [~~general~~] public, except where the location could affect persons other than the owner [~~or owners~~] and meet the requirements of section [~~12-220-11(a).~~] 12-220-2.1(c).

(b) All inspections and witnessing of tests for [~~boilers, pressure vessels, and pressure systems~~] pressure-retaining items as required pursuant to this [~~chapter,~~] part, shall be made in conformance with the procedures set forth in the ASME [~~Code,~~] BPVC, the [~~National Board Inspection Code,~~] NBIC, and this [~~chapter.~~] part. Where notations of discrepancies, recommendations, or requirements are made, these notations shall refer to the applicable rule of the ASME [~~Code,~~] BPVC, the [~~National Board Inspection Code,~~] NBIC, and this [~~chapter.~~] part.

(c) Power boilers shall receive a permit following an annual permit renewal internal inspection[~~.~~] upon approval by the chief boiler inspector. An external inspection shall be performed approximately six months after each internal inspection.

(d) Miniature electric boilers shall receive [~~a permit~~] a permit renewal inspection biennially. An internal inspection [~~shall~~] may be performed [~~when deemed necessary~~] by the inspector[~~.~~] pursuant to NBIC, Part 2 requirements, when necessary.

(e) Heating boilers shall receive [~~a permit inspection~~] permit renewal inspections as follows:

(1) Steam or vapor boilers with a heating surface of twenty (20) or less square feet shall have an external inspection [~~and an internal inspection~~] every two years [~~where construction permits~~]. An internal inspection may be conducted pursuant to NBIC, Part 2 requirements, when necessary, and where the construction of the boiler permits;

(2) Steam or vapor boilers, with a heating surface greater than [~~twenty five~~] twenty (20) square feet and less than or equal to one hundred (100) square feet, shall be externally inspected every two years and internally inspected at least every four years[~~.~~];

(3) Steam or vapor boilers with any one of the following criteria: a manway, a Btu input greater than 400,000, or a heating surface greater than one hundred (100) square feet, shall [~~be internally inspected annually and permitted annually.~~] receive a permit following an annual internal inspection upon approval by the chief boiler inspector. An external inspection shall be performed approximately six months after each internal inspection;

(4) [~~Hot water~~] Hot-water heating and [~~hot water~~] hot-water supply boilers shall have an external inspection every two years, and[~~,~~] where construction of the unit permits, an internal inspection [~~at the discretion of the inspector~~] may be conducted in lieu of the external inspection[~~.~~] pursuant to NBIC, Part 2 requirements, when necessary;

(5) Pool heaters shall have an external inspection every [~~four~~] two years[~~.~~]; and

(6) All non-code, nonstandard, or State special boilers and water heaters installed or operated in schools shall be externally inspected every two years and shall comply with the installation requirements of section [~~12-220-11.~~] 12-220-2.1. These objects are

designated as [~~"State specials"~~] state specials and shall be issued a [~~"permit to operate".~~] permit to operate. [~~A processing~~] An inspection and permit to operate fee will be assessed for the inspection of these objects.

(f) All pressure vessels shall receive a permit renewal inspection every two years and as follows:

(1) Unfired jacketed steam kettles with a cooking capacity of forty (40) gallons or more, or steam chambers exceeding five (5) cubic feet in volume receiving steam from an external source, [~~exceeding five cubic feet in volume~~] shall receive a permit inspection every two years[~~.~~];

(2) All non-code, nonstandard, or state special pressure vessels installed or operated in schools shall be externally inspected every two years and shall comply with the installation requirements of section [~~12-220-11.~~] 12-220-2.1. These objects will be designated as [~~"State specials"~~] state specials and be issued a [~~"permit to operate".~~] permit to operate upon approval by the chief boiler inspector. [~~Only a processing~~] An inspection and permit to operate fee will be assessed for the inspection of these objects[~~.~~];

(3) An internal inspection [~~shall~~] may be performed [~~when deemed necessary for continued safety by the inspector.~~] pursuant to NBIC, Part 2 requirements, when necessary; and

(4) Pressure vessels used for the treatment of wood shall be scrubbed clean for close visual inspection every ten years.

(g) Boilers and pressure vessels that are under the supervision of an [~~owner-user inspection agency~~] OUIO shall be inspected in accordance with the [~~National Board Inspection Code.~~] NBIC and this part. Pressure vessels may be inspected with a different permit inspection frequency but not to exceed every

four years upon approval by the chief boiler inspector.

[~~(h) Nuclear power plants that are included in chapter 397, HRS, shall be inspected as provided by section XI of the ASME Code.~~]

[~~(i)~~] (h) Based upon documentation of actual service conditions by the owner or user of the operating equipment, the department may, at its discretion, permit variations in the inspection frequency requirements[~~.~~] pursuant to section 12-220-33.1.

[~~(j)~~] (i) Power boilers having continuous internal water treatment under the general supervision of a qualified engineer or chemist, having a minimum of five [~~years~~] years' experience in the treatment of boiler water, at least one year of which shall have been on the boiler or boilers [~~in question,~~] in that person's supervision, where the water treatment is for the purpose of controlling and limiting serious corrosion and other deteriorating factors, may, upon approval of the director, be given permit inspections at intervals of not more than three years, in which case external inspections shall be performed at approximately [~~six-month~~] six month intervals between the internal inspections.

(1) The owner or user of a power boiler subject to this part shall keep an accurate record [~~which will show that~~] of the samples of boiler water [~~have been~~] taken at regular intervals not greater than [~~twenty four~~] twenty-four (24) hours of operation[~~, and the records shall show that the water conditions in the boiler meet the controlling and limiting factors mentioned in this section in accordance with the standards and codes approved by the department~~]. The owner or user [~~of boilers~~] shall also keep a record of the date and actual time that boilers were out of service and the reasons therefore. All records mentioned in this section are to be made available by the owner or user [~~of~~

~~boilers~~] to the inspector for examination[~~.~~] upon request;

(2) When a biennial internal inspection is desired by a power boiler owner[~~,~~] or user subject to this section, a written application for consideration shall be made to the department. The application shall contain[~~, in sufficient detail,~~] the following information:

(A) Use of the boiler;

(B) Boiler technical data, name of manufacturer, and all identifying numbers;

(C) Name and pertinent qualifications of the qualified engineer or chemist in charge of water treatment;

(D) The laboratory facilities used for testing and analyzing boiler water;

(E) The boiler water analysis standards established and achieved over the preceding twelve (12) [~~months~~] month period;

(F) Method and frequency of sampling water;

(G) Percentage of makeup water;

(H) Record of boiler outages occurring since the last internal inspection; and

(I) [~~Report~~] The biennial inspection report [~~from a special or deputy~~] by a qualified boiler inspector [~~relative~~] relating to the acceptability of the boiler [~~for biennial inspection.~~]; and

(3) [~~On~~] Upon approval of the application by the department, the expiration date of the current annual operating permit shall be extended for a period of one year. Subsequent permits shall be issued to expire annually and may be extended for not more than one year provided the boiler reports submitted to the department, at periods as shall be required, indicate that the approved standards and codes are being

maintained and [~~provided that~~] if all other conditions are being met.

[~~(k)~~] (j) [~~Notification~~] The following shall apply to the notification of unsafe [~~boilers, pressure vessels, and pressure systems.~~] pressure retaining items:

(1) If a special inspector, upon first inspection of a new risk, finds that a [~~boiler, pressure vessel, or pressure system,~~] pressure retaining item, or any appurtenance thereof, is in [~~such~~] a condition that the insurance company would refuse insurance, the company shall immediately notify the department[~~.~~]; and

(2) If, upon inspection, a special inspector finds a [~~boiler, pressure vessel, or pressure system~~] pressure retaining item to be unsafe [~~for further operation~~], the special inspector shall promptly notify the owner or user, stating what repairs or other corrective measures are required to bring the object into compliance with these rules. Unless the owner or user makes repairs or adopts other corrective measures promptly, the special inspector shall immediately notify the department. Unless timely corrections have been made, no further operation of the [~~boiler, pressure vessel, or pressure system~~] pressure retaining item [~~involved~~] shall be permitted. If an operating permit for the object is required and is in force, it shall be suspended by the special inspector[~~.~~] if timely corrections have not been made. When [~~reinspection~~] re-inspection establishes that the necessary repairs have been made or corrective actions have been taken and that the [~~boiler, pressure vessel, or pressure system~~] pressure retaining item is safe to operate, the department shall [~~be notified and an operating permit will be issued by the~~

~~special inspector.~~] issue an operating permit.

[~~(l)~~] (k) When [~~Defective~~] defective conditions are disclosed [~~at time of inspection. If, upon an~~] during the inspection, or there is evidence of a leak or crack, adequate access shall be provided to permit the inspector to satisfactorily determine the safety of the [~~boiler, pressure vessel, or pressure System.~~] pressure retaining item.

[~~(m)~~] (l) [~~Notification of inspection.~~] Permit inspections, as required in section [~~12-220-16,~~] 12-220-15, shall be carried out prior to the expiration date of the certificate at a time mutually agreeable to the inspector and owner or user. External inspections may be performed by the inspector during reasonable hours and without prior notification. When, [~~as a result~~] because of an external inspection or determination by other objective means, it is the inspector's opinion that continued operation of the [~~boiler or pressure vessel~~] pressure retaining item constitutes a danger to personnel or property, the inspector may request an internal inspection or an appropriate pressure test, or both, to evaluate conditions. In these instances, the owner or user shall prepare the [~~boiler, pressure vessel, or pressure system~~] pressure retaining item for inspections or tests as the inspector [~~designates.~~] requires.

[~~(n)~~] (m) [~~Submission of inspection reports.~~] The following requirements shall apply to the submission of inspection reports:

(1) Inspectors shall submit to the department an inspection report on Form NB-5 of the [~~National Boiler Inspection Code~~] NBIC, or similar forms approved by the department, for each [~~boiler and pressure vessel~~] pressure retaining item subject to [~~inspection in Hawaii.~~] chapter 397, HRS. Complete data shall be submitted for each [~~state special~~] nonstandard [~~boiler, pressure vessel, or pressure system.~~] pressure retaining item;

(2) Subsequent inspections by [~~deputy inspectors, owner-user inspectors, and special inspectors~~] qualified inspectors of both standard and nonstandard [~~boilers, pressure vessels, and pressure systems~~] pressure retaining items shall be reported on Forms NB-6 and NB-7 of the [~~National Board Inspection Code~~] NBIC, or similar forms approved by the department[~~.~~];

(3) Inspection reports following the requirements of [~~subsections (a) (b) above~~] paragraphs (1) and (2) shall be submitted within thirty (30) days from the date of the inspection[~~.~~]; and

(4) Owner-user inspection [~~agencies~~] organizations shall file [~~report~~] reports [~~in accordance with this subsection or upon forms acceptable to the department, and the report shall be filed as provided in~~] pursuant to section 12-220-19.

[~~(o)~~] (n) Notification by insurance companies. All insurance companies shall notify the department within thirty (30) days [~~of~~] on all [~~boilers, pressure vessels, or pressure systems~~] pressure retaining items [~~on~~] for which insurance is written, canceled, or not renewed.

[~~(p)~~] (o) [~~Procedure for follow-up inspections by special inspectors.~~

~~(1)~~] If during a routine inspection by a special inspector, a pressure retaining item is found to have discrepancies, the length of time for temporary use of [~~such~~] the item, and the correction of the discrepancies will be at the discretion of the special inspector, but no more than [~~90~~] ninety (90) days. A follow up inspection shall be made by the special inspector in a timely manner and the department notified. [~~The discrepant safety devices that can lead to catastrophic failure causing potential damage to the property or cause serious injury or death shall be immediately replaced or the~~

~~operation of the pressure retaining item suspended.~~] The nonconforming safety devices shall be immediately replaced or the operation of the pressure retaining item suspended.

[~~(2) Follow-up~~] Follow up inspections not performed by the special inspector within the time [~~period~~] prescribed by the department may be conducted by the department [~~and such~~]. The [~~and such~~] authorized inspection agency [~~will~~] shall be invoiced at [~~$100~~] $125 per hour with a minimum of [~~2~~] two hours charged. [Eff 12/6/82; am 12/8/86; am, ren §12-220-16, and comp 12/6/90; am 7/6/98; am 6/19/00; am 11/18/12; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-17 Investigations. The department shall investigate, in accordance with section 12-220-27, accidents involving [~~boilers, pressure vessels, or pressure systems, inspected under~~] pressure retaining items subject to this chapter and may issue orders and recommendations with respect to the elimination and control of the cause factors. [Eff 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §§397-4, 397-6)

§12-220-18 Inspectors. (a) [~~Boiler inspectors.~~] The following shall apply to inspectors:

(1) The director shall appoint a chief boiler inspector who has had at the time of appointment not less than ten years' experience in the construction, installation, inspection, operation, maintenance or repair of pressure retaining items as a mechanical engineer,

steam operating engineer, boilermaker, or boiler inspector; and

(2) The chief boiler inspector shall enforce the requirements of this part, take action necessary for the enforcement of the laws of the State governing the use of pressure retaining items, and keep a complete record of the type, dimensions, maximum allowable working pressure, age, condition, location, and date of last internal inspection of all pressure retaining items.

[~~1~~] (3) Required inspections of [~~boilers, pressure vessels, and pressure systems~~] pressure retaining items shall be performed by [~~boiler~~] inspectors [~~in the employ of the department who are qualified boiler inspectors or may be performed by special inspectors who are qualified boiler inspectors, in the employ of insurance companies who meet the requirements of the National Board for insuring boilers or pressure vessels in Hawaii. Boilers, pressure vessels, and pressure systems owned by an owner user inspection agency may be inspected by qualified inspectors employed by such inspection agency.~~] as defined in section 12-220-1;

[~~(2) A qualified boiler inspector is a person in possession of a valid commission issued by the National Board and who has received instructions regarding rules and regulations pertaining to boilers, pressure vessels, and pressure systems in Hawaii from the director or authorized representative.~~]

[~~(3)~~] (4) [~~On application and payment of the fee set forth in table 220-2 in section 12-220-35 a~~ ~~certificate of competency may be issued to individuals holding a current National Board commission and employed by one of the following:~~

~~(A) An insurance company insuring boilers and pressure vessels in Hawaii; or~~

~~(B) A company qualified by the National Board of Boiler & Pressure Vessel Inspectors as an accredited authorized inspection agency~~

~~The Certificate of Competency will be issued after the employee has appeared before the director or authorized representative.~~]

An application to take the State of Hawaii certificate of competency examination shall be filed at least sixty (60) days in advance and on the form provided by the department and must be accompanied by the remittance of the fee as per the schedule in Exhibit A, titled, "Installation, Repair or Alteration Permit Fees, and Licensure, Examination, and Registration Fees", dated September 1, 2019, which is made part of this chapter and located at the end of this chapter;

(5) The certificate of competency shall be issued after the inspector has appeared before the director or the director's authorized agent, such as the chief boiler inspector;

[~~(4)~~] (6) The certificate of competency, unless suspended, revoked, or canceled, shall expire one year from the date of issue or renewal[~~.~~];

[~~(5)~~] (7) [~~The~~] An insurance company employing [~~these~~] special inspectors shall notify the department in writing when the employment of [~~the~~] a special inspector is terminated[~~.~~]; and

[~~(6)~~] (8) [~~A National Board~~] Upon approval of an applicant's request, a State of Hawaii examination for certificates of competency to inspect [~~boilers and pressure vessels~~] pressure retaining items shall be administered by the department on the first Wednesday of March, June, September, and December of each year.

[~~(A) Applicants shall have at least five years of experience at a journeyman level, or the equivalent, in boiler or pressure vessel construction or repair or operating engineer in charge of high pressure boilers or inspector of steam boilers or pressure vessels. An associate degree in mechanical engineering from a curriculum accredited by the Accreditation Board for Engineering and Technology college or university shall be the equivalent of two years of practical experience. A degree in mechanical engineering from a curriculum accredited by the Accreditation Board for Engineering and Technology college or university shall be the equivalent of four years of practical experience.~~]

[~~(B)~~] (A) [~~Application~~] Applications for a State of Hawaii examination [~~by a person other than an employee of the department~~] for a certificate of competency shall be in writing upon a form provided by the department. If the applicant's [~~history~~] credentials and work experience are in accordance with NB-263, RCI-1, and meet with the approval of the department, the applicant shall be given a written examination dealing with the construction, installation, operation, maintenance, or repair of [~~boilers and appurtenances.~~] pressure retaining items, and the requirements of this part. If the applicant is successful in completing the test and [~~meeting~~] meets all the requirements, a certificate of competency shall be issued by the department. An applicant who fails to pass the examination shall be permitted to take another written examination

after the expiration of ninety days. The fee remitted with the application shall be good for six months during which a re-examination must be taken[~~.~~]; and

[~~(C) Each applicant taking the examination for a certificate of competency, except those in the employ of the State, shall pay the fee set forth in table 220-2, in section 12-220-35. In the event an applicant fails to pass the examination, this fee shall be good for a period of six months during which a reexamination may be taken. The fee must accompany the application. The application shall be filed in the office of the department at least thirty days prior to the date of examination.~~]

[~~(D)~~] (B) [~~Each boiler, pressure vessel, and pressure system inspector~~] Inspectors [~~in the employ of~~] employed by the [~~State~~] department shall pass the National Board examination and be issued a certificate of competency from the department during the probationary employment period. A commission from the National Board shall then be obtained by the department to enable the employee to become a qualified boiler inspector.

(b) Commissions to inspect shall be always carried [~~at all times~~] by inspectors while engaged in the performance of inspectional duties. [~~Commissions~~] Certificates of competency are non-transferable.

(c) The certificate of competency and commissions issued to an inspector may be suspended by the director or chief boiler inspector for cause and may be revoked after due investigation and recommendation by the department upon ten days' notice to the inspector and to the inspector's employer. Cause for suspension or revocation shall [~~be~~] include, but not

be limited to, incompetency, [~~or~~] untrustworthiness, wilful falsification of any matter or statement contained in the inspector's application, or in the report of any inspections, or any other sufficient reason[~~.~~] in the discretion of the director. Prior to revocation, the holder of the certificate of competency or commission shall be entitled to a hearing before the director[~~.~~] or the director's authorized agent. A person whose [~~commission or~~] certificate of competency has been suspended or revoked, except for untrustworthiness, shall be entitled to apply to the department for reinstatement, or[~~,~~] in the case of revocation, for a new examination and [~~commission~~] certificate of competency ninety days (90) after the revocation.

(d) No person shall be authorized to act for the State [~~either~~] as an inspector [~~or a special inspector~~] who is directly interested in the manufacture, sale, [~~or~~] repair, or alteration of any equipment or any appurtenance used on any equipment which is inspected pursuant to chapter 397, HRS.

[Eff 7/6/98; am 11/18/12; am and comp] (Auth: HRS §397-4) (Imp: HRS §§397-4, 397-6)

§12-220-19 Owner-user inspection [~~agency.~~] organization. (a) Any person, firm, partnership, or corporation operating [~~boilers, pressure vessels, and pressure systems~~] pressure retaining items in Hawaii may seek approval and registration as an [~~owner-user inspection agency~~] OUIO by [~~filing~~] submitting an application [~~to~~] with the department.

(b) The application and registration shall show the name of the [~~agency~~] OUIO and its principal address in Hawaii[~~, and~~] as well as the name and address of the person [~~having supervision over inspections made by the agency.~~] charged with the implementation of the requirements of the established inspection program. Changes in the organization's inspection program, including its organizational chart and supervisory personnel,

shall be reported to the department within thirty days after any change.

(c) The applicant sha11 set forth in writing the program, procedures, and organizational chart [~~as shown in Part RA of the National Board Inspection Code: These documents~~] in a manner prescribed by the department and shall meet the requirements of NB-381. The complete application sha11 be submitted to the department for approval prior to implementation.

(d) Each [~~owner-user inspection agency~~] OUIO shall:

(1) Conduct inspections of [~~boilers, pressure vessels, and pressure systems~~] pressure retaining items not exempt [~~by~~] from chapter 397, HRS, utilizing only qualified boiler inspectors, [~~as defined m section 12-220-18(a);~~] pursuant to section 12-220-18 and as defined in section 12-220-1;

(2) Execute and deliver to the department the inspection reports on [~~vessels~~] pressure retaining items inspected [~~which~~] that shall include appropriate requirements or recommendations [~~that result from~~] based on the inspection. [~~Such reports~~] Reports shall be submitted as soon as possible but no later than thirty calendar days after the completion of the inspection;

(3) Promptly notify the department of any [~~boiler, pressure vessel, or pressure systems~~] pressure retaining item that does not meet the requirements for safety; [~~and~~]

(4) Maintain inspection records [~~which~~] that shall include:

(A) A list of each boiler, pressure vessel, or pressure systems [~~covered by~~] subject to chapter 397, HRS, complete with National Board number, serial number, and [~~abbreviated~~] descriptions necessary for identification;

(B) A true record or copy of the latest report of each inspection [~~which~~] that shall be signed by the inspector who made the inspection; and

(C) The approximate date of the next inspection pursuant to [~~be determined by the appropriate rules in Part RB of~~] the [~~National Board Inspection Code and all data available at the time the inspection record is compiled.~~] NBIC and the jurisdiction;

(5) Employ inspectors who meet the requirements of NB-263, who hold a valid National Board Inservice Commission (IS), and an "R" endorsement if the scope of inspections include repair or alteration inspections, and meets the requirements of section 12-220-18; and

(6) Select and designate a technical supervisor meeting the requirements of paragraph (5), and who shall have passed the examination developed and administered by the National Board, and received an "O" endorsement from the National Board.

(e) Inspection records shall be readily available for [~~examination~~] annual review and audit by the department during business hours. [Eff 12/6/82; am 12/8/86; am, ren §12-220-19, and comp 12/6/90; am 7/6/98; am 6/29/00; am and comp] (Auth: HRS §§397-4, 397-5, 397-6) (Imp: HRS §§397-4, 397-5, 397-6)

§12-220-20 Fees. (a) [~~Departmental inspections fees.~~] The following shall apply to fees:

(1) The department shall charge and collect from the owner, user, lessee, contractor, or insurance company [~~referred to in this chapter as the beneficiary, the fees listed in table 220-3 in section 12-220-35~~] a fee,

including a permit processing fee, and an inspection report fee, per the schedule in Exhibit B, titled, "Internal & External Inspection Fees", dated September 1, 2019, which is made part of this chapter and located at the end of this chapter, for each inspection made by an inspector during regular working hours. The department shall charge and collect a [~~permit processing~~] fee [~~as listed in table 220-3 in section 12-220-35 for each object inspected and~~] for each duplicate permit to operate [~~requested.~~];

[~~(2) When it is necessary to make a special trip to witness a test, an additional fee based upon the scale of fees for a permit inspection for the object under test shall be charged.~~]

[~~(3)~~](2) For all other inspections and services, the fee shall be [~~$100~~] $125 per hour but not less than [~~$200~~] $250 per occurrence during regular working hours and [~~$150~~] $175 per hour but not less than [~~$300~~] $350 per occurrence when performed outside regular working hours [~~at the request of the beneficiary.~~];

[~~(4)~~](3) Scheduled inspections delayed or canceled [~~by the beneficiary,~~] and too late to prevent the arrival of the inspector on the premises, shall be charged [~~for~~] in accordance with the scheduled fee for the type of inspection[~~;~~].[~~however, if~~] If the notice of cancellation or delay of a scheduled inspection is given [~~in time to prevent the incurring of travel expenses~~] forty-eight (48) hours beforehand, then no fee will be charged[~~.~~];

[(~~5~~)](4) The charge for a rescheduled inspection or a call back inspection to allow a [~~boiler, pressure vessel, or pressure system,~~] pressure retaining item to operate [~~may~~] shall be at the scheduled

fee for the type of inspection [~~or for~~] plus the expenses [~~actually~~] incurred, [~~whichever is greater.~~] including, but not limited to, the inspector's time, mileage, and travel expenses;

[~~(6)~~] (5) When an unscheduled inspection request is made [~~at the request of and~~] for the benefit of an owner, user, contractor, or vendor, the sum of expenses incurred, including the hourly fee if applicable, shall be charged in addition to the inspection fee[~~.~~];

[~~(7)~~] (6) Whenever the beneficiary of an inspection fails to pay the fees required under this section within sixty days (60) after notification, the [~~boiler, pressure vessel, or pressure system~~] pressure retaining item shall be tagged out of service and permit revoked [~~and the beneficiary shall pay, in~~]. In addition to the fees required, the department shall charge the beneficiary a penalty equal to fifty per cent of the fee. For [~~the purpose of~~] this section, the date of invoice shall be considered the date of notification. Upon payment of fees, the operating permit shall be reinstated and issued[~~.~~]; and

[~~(8)~~] (7) Departmental reports of inspections for which expenses must be added to the basic fee shall be accompanied by an itemized account of the inspections made and the expenses incurred.

(b) Departmental installation, repair, routine repair, and alteration permit [~~and test~~] fees.

[~~(1) A group of pressure vessels, such as the rolls of a paper machine or dryers operating as a single machine or unit, shall be considered as one pressure vessel.~~

~~(2)~~] (1) The department shall, before issuance of a permit [~~for installing, constructing, re-constructing, or relocating,~~] to install, repair, routine repair, alter, construct, or

relocate, charge and collect a fee for each object [~~in accordance with table 220-1 in section 12-220-35.~~] per the schedule in Exhibit A, titled, "Installation, Repair or Alteration Permit Fees, and Licensure, Examination, and Registration Fees", dated September 1, 2019, which is made part of this chapter and located at the end of this chapter;

[~~(3) The department shall, before issuance of authorization for a repair, or alteration, charge and collect a fee for each object in accordance with table 220-1 in section 12-220-35.~~

~~(4)~~] (2) For each instance requiring an installation permit fee, the department shall provide:

(A) [~~The~~] A plan review, an inspection and witnessing of the acceptance test, [~~on the installation~~] and one additional [~~followup~~] follow up inspection[~~;the followup inspection shall be~~] at the convenience of the department. [~~Any~~] The department shall charge for additional inspections [~~required~~] for final acceptance [~~will be~~] and at the expense of the [~~beneficiary of the inspection~~] requesting party. Additional inspections [~~and~~] may be at the convenience of the [~~beneficiary provided~~] requesting party if all the expenses incurred are paid [~~by the beneficiary~~] and [~~forty-eight hours~~] fifteen days' (15) [~~advance~~] notice is given to the department;

(B) The processing and issuance of the temporary permit to operate; and

(C) The processing and issuance of the final permit[~~.~~]; and

[~~(5)~~] (3) [~~Fees in accordance with table 220-1 in section 12-220-35 or the fee in effect on the application submittal date shall be charged and collected for all installation permits issued.~~] Failure to obtain a permit prior to [~~completion of~~] commencement of work on the installation, routine repair, or alteration of a [~~boiler or pressure vessel~~] pressure retaining item will double the permit fee in addition to penalties.

[~~(6) or more than one additional inspection for final acceptance, the department may charge and collect from the beneficiary an additional amount in accordance with subsection (a) (3).~~]

(c) The department shall charge for [~~Boiler~~] boiler inspector examination and license fees, [~~according to table 220-2 in section 12-220-35.~~] per the schedule in Exhibit A, titled, "Installation, Repair or Alteration Permit Fees, and Licensure, Examination, and Registration Fees", dated September 1, 2019, which is made part of this chapter and located at the end of this chapter.

(d) The department shall charge for audits of inspections conducted by OIOUs and insurance agencies. [Eff 7/6/98; am 11/18/12; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-5)

§12-220-21 Rights and enforcement. (a) Rights.

(1) Authorized representatives of the director may enter without delay during regular working hours and at other reasonable times, any place, establishment, or premises [~~in which are located~~ ~~boilers, pressure vessels, or pressure systems requiring inspection~~

~~pursuant~~] where pressure retaining items are located that are subject to chapter 397, HRS[~~.~~];

(2) The department may question any employer, owner, operator, agent, or employee in investigation, enforcement, and inspection activities covered by this chapter[~~.~~]; and

(3) Any employee of the State acting within the scope of the employee's office, employment, or authority under chapter 397, HRS, shall not be liable for or made a party to any civil action arising out of administration and enforcement of chapter 397, HRS.

(b) Enforcement.

(1) Whenever an authorized representative of the director is denied the right of entry to a place to inspect any [~~boiler, pressure vessel, or pressure system required by this chapter to be inspected is refused to an authorized representative of the director,~~] pressure retaining item subject to inspection by this chapter, the department may apply to the circuit court where the place exists for a search warrant providing on its face that the wilful interference with its lawful execution may be punished as a contempt of court[~~.~~];

(2) Whenever the department finds that the construction of, or the operation of any [~~boiler, pressure vessel, or pressure system required to be inspected~~] pressure retaining item subject to inspection by this chapter is not safe, or that any practice, means, method, operation, or process employed or used is unsafe; or is not in conformance with the standards and codes adopted pursuant to chapter 91, HRS, the department shall issue an order to render the construction or operation

safe in conformance with chapter 397, HRS[~~,~~]. [~~or standards and codes and~~] The department shall deliver the [~~same~~] order to the contractor, owner, or user[~~. Each order shall be~~] in writing and may be delivered by mail, electronic mail, or in person. The department may in the order direct that, in [~~the~~] a manner and within a time specified, [~~such~~] additions, repairs, improvements, or changes [~~be made~~] and [~~such~~] safety devices and safeguards be furnished, provided, and used as are reasonably required to ensure compliance with the purposes and provisions of chapter 397, HRS. The owner, user, or contractor shall obey and observe all orders issued by the department or be subject to [~~appropriate~~] civil penalties[~~.~~] pursuant to section 12-220-22;

(3) Whenever, in the opinion of the department, the condition of, or the operation of [~~boilers, pressure vessels, or pressure system required to be inspected~~] a pressure retaining item subject to inspection by chapter 397, HRS, or any practice, means, method, operation, or process employed [~~or used,~~] is unsafe, or is not properly guarded, or is dangerously placed, [~~its~~] use of the pressure retaining item may be prohibited by the department. An order to that effect shall be posted prominently on the equipment, or near the place or condition referred to in the order. The order shall be removed when a determination has been made by an authorized representative of the department that the [~~boilers, pressure vessels, or pressure system are~~] pressure retaining item is safe and the required safeguard or safety devices are provided[~~.~~];

(4) Pursuant to section 397-4(d)(4), HRS, the department may apply for a restraining order from a circuit court to effect enforcement[~~.~~];
(5) Pursuant to section 397-4(d)(5), HRS, the director, or an authorized representative, shall have the same powers possessed by the court respecting administering of oaths, compelling attendance of witnesses, producing documentary evidence, and examining witnesses or causing them to be examined, and may take depositions and certify to official acts[~~.~~];
(6) Where a condition or practice involving any [~~boiler, pressure vessel, or pressure system required to be inspected~~] pressure retaining item subject to inspection by chapter 397, HRS, could reasonably be expected to cause death or serious physical harm, the department shall have the right, independent of any other enforcement powers under this chapter, to:
    (A) Immediately take steps to obtain abatement by informing the owners, users, contractors, and all persons in [~~harms~~] harm's way of the hazard by meeting, posted notice, or otherwise;
    (B) Take steps to immediately obtain abatement through direct control or elimination of the hazard if, after reasonable search, the user, owner, contractor, or their representative is not available;
    (C) Take steps to obtain immediate abatement when the nature and [~~imminency~~] imminence of the danger or hazard does not permit a search for the owner, user, or contractor; and

(D) Where appropriate, initiate necessary legal proceedings to require abatement by the owner, user, or contractor[~~.~~]; and

(7) The department may prosecute, defend, and maintain actions in the name of the department for the enforcement of the provisions of chapter 397, HRS, including the enforcement of any order issued by it, the appeal of an administrative or court decision, and other actions necessary to enforce chapter 397, HRS. [Eff 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §§397-4, 397-6, 397-8)

§12-220-22 Violations and penalties. (a) The director may assess all civil penalties provided in this section, giving due respect to the gravity of the violation, the good faith of the owner, user, consultant, contractor, or vendor, and the history of previous violations.

(b) Violations.

(1) Any owner, user, consultant, contractor, [~~or vendor~~] vendor, or person who violates chapter 397, HRS, or any safety standards, rules, and codes adopted pursuant to chapter 91, HRS[~~,~~]; or who violates or fails to comply with any order made [~~under or by virtue of~~] pursuant to chapter 397, HRS, or who defaces, displaces, destroys, damages, or removes without the authority of the department any safety device, safeguard, notice, order, or warning required by chapter 397, HRS, standards, or codes, shall be assessed a civil penalty of not more than [~~10,000~~] $10,000 for each [~~such~~] violation[~~.~~]; and

(2) Each day a violation continues shall constitute a separate violation except during an abatement period.

(c) Discrepancies and penalties.

(1) Any conditions found [~~not~~] in [~~conformance~~] nonconformance with applicable standards, rules, or codes, adopted pursuant to chapter 91, HRS, shall be regarded as discrepancies and the department shall [~~be made known to~~] notify the owner, user, consultant, contractor, [~~or vendor~~] vendor, or person by letter, or written [~~"order to correct" or both.~~] order to correct that shall be mailed, or sent by electronic service. All discrepancies shall be satisfactorily resolved as soon as possible. When, in the opinion of the department, a discrepancy constitutes a potentially serious or imminent hazard, it may prohibit the use of the equipment until the condition is abated. Failure to abate unsafe conditions, or failure to correct discrepancies within the time prescribed, shall be a violation subject to the civil penalties prescribed in this section[~~.~~]; and

(2) Assessing penalties.

(A) Consideration shall be given to the gravity of the violation. For a violation that could not or probably would not result in serious harm to life or property, the penalty may be reduced by forty per cent[~~.~~];

(B) Consideration shall be given to the good faith of the owner, user, consultant, contractor, or vendor. For immediate correction or for attempts to make corrections or abate hazards that have been thwarted by conditions beyond the control of the owner, user, consultant, contractor, or vendor, the penalty may be reduced by forty per cent[~~.~~]; and

(C) Consideration shall be given for the history of previous violations. For few or no previous violations by the owner, user, consultant, contractor, or vendor, the penalty may be reduced by twenty per cent.

(d) Anyone who knowingly makes a false statement on any document required by chapter 397, HRS, shall[~~,~~] upon conviction, be punished by a fine of no more than $10,000 or by imprisonment for not more than six months, or by both. Any evidence suggesting that a false statement may have been made shall be immediately referred to the director, who shall consult with the attorney general for purposes of initiating appropriate action. [Eff 7/6/98; am 11/18/12; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-8)

§12-220-23 Review and appeal. (a) Any order of the director shall be final and conclusive against the owner, user, vendor, consultant, [~~or~~] contractor, or person unless a written notice of contest of the order is filed with the director specifying what is being contested within twenty (20) days after receipt of [~~such~~] the order.

(b) The owner, user, vendor, consultant, or contractor may petition the director for modification of the abatement requirements in an order, provided the petition is filed no later than the close of the next business day following the date on which abatement is required. Under exceptional circumstances and for good cause shown, the petition may be filed [~~at a later date.~~] later. The director shall issue an order either affirming or modifying the abatement requirement.

(c) The director shall advise the appeals board upon receipt of notice of contest.

(d) The appeals board shall afford an opportunity for hearing on any notice of contest [~~in accordance with adopted rules of practice and procedure.~~] pursuant to section 397-9, HRS. [Eff 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-9)

§12-220-24 Judicial review. Judicial review of a decision and order of the appeals board may be obtained in the manner provided for in chapter 91, HRS, by instituting proceedings in the circuit court of the circuit in which the [~~boilers, pressure vessels, and pressure systems are~~] pressure retaining item is located. [Eff 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-10)

§12-220-25 Trade secrets. Information obtained by the department containing or revealing a trade secret shall be held confidential and access shall be limited to authorized representatives of the director [~~concerned with carrying out~~] pursuant to chapter 397, HRS, [~~or~~] and when relevant in any proceedings [~~under~~] pursuant to chapter 397, HRS. [Eff 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-11)

§12-220-26 Evidence. No record or determination of any administrative proceedings [~~under~~] pursuant to chapter 397, HRS, or any statement or report of any kind obtained or received in connection with the administration or enforcement of chapter 397, HRS, shall be admitted or used, whether as evidence or a discovery, in any civil action growing out of any

matter mentioned in the record, determination, statement, or report other than an action for enforcement or review under chapter 397, HRS. [Eff 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-12)

§12-220-27 Reporting of accidents. (a) Whenever an accident, as defined by section 12-220-1, occurs to [~~either a boiler, pressure vessel, or pressure system~~] a pressure retaining item, the owner, user, or maintenance company shall promptly notify the division by submitting a detailed accident report. [~~For reporting purposes, accident is defined as an occurrence resulting in damage to a boiler, pressure vessel, or pressure system rendering it inoperative or any occurrence resulting in physical injury requiring treatment by a physician.~~]

(b) Whenever an accident occurs [~~which~~] that results in the loss of life [~~or inpatient hospitalization,~~] the owner, user, or maintenance company shall promptly notify the division by telephone [~~or messenger~~] at (808) 586-9141 or electronic mail at dlir.hiosh.boiler@hawaii.gov within [~~forty-eight~~] eight (8) hours[~~,~~] after the event. Whenever an accident occurs involving inpatient hospitalization, the owner, user or maintenance company shall notify the division within twenty-four (24) hours. In either case, [~~and neither the boiler, pressure vessel, or pressure system~~] the pressure retaining item, or any of [~~their~~] its parts, shall not be removed or disturbed before permission has been given by the department, except for the purpose of saving human life and limited consequential damage.

(c) Additional reports, in writing or otherwise, may be required by the director. [Eff 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-220-28 Suspending operation[~~.~~]; condemned [~~boilers and pressure vessels~~] pressure retaining items. (a) If, upon inspection, a [~~boiler, pressure vessel, or pressure system~~] pressure retaining item is [~~found to be unsafe to operate, the~~] declared unfit for further operation by an inspector, the inspector shall notify the department and the permit to operate [~~may~~] shall be suspended by the department. The pressure retaining item shall be stamped on either side of the state number with the letters XXX so that the number would read as follows: XXX-HAW-###-##-XXX. The stamping with the Xs shall designate a condemned item.

(b) Any person, firm, partnership, or corporation [~~causing~~] operating, using, or selling any unsafe [~~boiler, pressure vessel, or pressure system~~] pressure retaining item, and notwithstanding section 12-220-22, [~~to continue to be operated~~] shall be subject to [~~the penalty provided in the law.~~] a penalty of up to $10,000 per day of operating, use, or offering for sale any unsafe pressure retaining item. [Eff 7/6/98; am and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-220-29 Condemned boilers and pressure vessels.** (a) Any boiler or pressure vessel having been inspected and declared unfit for further service by an authorized inspector shall be stamped on either side of the State number with the letters "XXX" as shown by the following facsimilie, which will designate a condemned boiler or pressure vessel:~~

~~XXX HAW 000-00 XXX~~

~~(b) Any person, firm, partnership, or corporation using or offering for sale a condemned boiler or pressure vessel for operation within~~

~~Hawaii shall be subject5 to the penalties provided by the Law.~~] [Eff 7/6/98; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~§12-220-30~~] **§12-220-29.1 Reinstallation of** [~~**boilers, pressure vessels, or pressure systems.**~~] **pressure retaining items.** [~~When a~~] Before an owner or user of a [~~standard boiler, pressure vessel, or pressure system~~] pressure retaining item located in Hawaii [~~is to be moved~~] relocates the object outside of the jurisdiction for temporary use or repair, an application shall be made by the owner or user to the department for permission to reinstall the [~~boiler, pressure vessel, or pressure system~~] pressure retaining item back in the jurisdiction[~~.~~] pursuant to section 12-220-5. When a nonstandard [~~boiler, pressure vessel, or pressure system~~] pressure retaining item, as defined in section 12-220-2.1(c), is removed, it shall not be reinstalled within Hawaii. [Eff 7/6/98; §12-220-30; am, ren §12-220-29.1, and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~§12-220-31~~] **§12-220-30.1 Application of State serial numbers.** (a) Upon completion of the installation of a [~~boiler or pressure vessel~~] pressure retaining item, or at the time of the initial permit inspection of an existing installation, each [~~boiler or pressure vessel~~] pressure retaining item shall be stamped or marked by the inspector employed by the department with a state serial number, consisting of letters and figures to be not less than 5/16 inch in height and arranged:

For power boilers	HAW-[~~0000~~]####-YEAR
For heating boilers	HHB-[~~0000~~]####-YEAR
For pressure vessels	HPV-[~~0000~~]####-YEAR

Heating boilers assigned state serial numbers prior to January 1984 had the prefix HAW NO. 0000-YEAR. In each case, the year shall be a part of the number.

(b) All [~~boilers and pressure vessels~~] pressure retaining items constructed of cast iron, or of material of a thickness that [~~it should not~~] cannot be stamped[~~,~~] in accordance with the ASME BPVC, shall have a securely attached [~~a~~] corrosion resistant label plate containing the required manufacturer's stamping[~~.~~], or directly marked by other means on the pressure retaining item. The State serial number shall be stamped or marked by other means on the label plate[~~,~~]. [~~or it shall be applied by means of an adhesive backed labeling tape on or near the label plate.~~] [Eff 7/6/98;1 §12-220-31; am, ren §12-220-30.1, and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-220-32**~~] **§12-220-31.1 Notification of transfer and location.** [~~(a)~~] The contractor, erector, seller, vendor, or any person responsible for the transfer of ownership, shall notify the department in writing within thirty (30) calendar days giving the address, name, and phone number of the purchaser [~~for~~] of any [~~boiler, pressure vessel or pressure system~~] pressure retaining item except those exempted by section [~~12-220-16(a)~~] 12-220-15. [~~sold in this jurisdiction. For new installations of boilers, pressure vessels, or pressure systems, a copy of the manufacturer's data report and the approximate installation date shall be provided.~~]

(1) The owner or user of any existing [~~boiler, pressure vessel, or pressure system~~] pressure retaining item operated in the State, except [~~boilers, pressure vessels, and pressure systems~~] those exempted by section [~~12-220-16(a)~~] 12-220-2.1(c), and those for which an operating permit has been issued, shall report the location thereof to the department[~~.~~];

(2) [~~The~~] An owner or user planning to install [~~of~~] any [~~boiler, pressure vessel, or pressure system,~~] pressure retaining item except those exempted by section [~~12-220-16(a)~~] 12-220-2.1(c), [~~to be installed in the State,~~] shall notify the department in writing or by electronic mail at dlir.hiosh.boiler@hawaii.gov of the proposed location of the installation stating whether the [~~boiler, pressure vessel, or pressure system~~] unit is new, reinstalled, or secondhand. If it is a reinstalled or a secondhand [~~boiler, pressure vessel, or pressure system,~~] pressure retaining item, the owner or user shall, in addition to the above information, give the Hawaii number or otherwise identify the [~~boiler, pressure vessel, or pressure system.~~] pressure retaining item. The owner or user of a portable [~~boiler or pressure vessel~~] pressure retaining item shall not be required to report each change in location unless the change is from one island to another.

(3) When [~~any boiler, pressure vessel, or pressure system, regulated by~~] a pressure retaining item, subject to this chapter, is removed from service, the owner shall notify the department [~~of the removal.~~] in writing or by electronic mail at dlir.hiosh.boiler@hawaii.gov. The notification [~~shall be written and~~] shall state the disposition made or [~~to be made of~~] planned for the [~~boiler, pressure vessel, or pressure system.~~] pressure retaining item. The notification shall occur prior to the relocation or removal from service [~~or operation~~] of the [~~boiler, pressure vessel, or pressure system.~~] pressure retaining item.

[Eff 7/6/98; §12-220-32; am, ren §12-220-31.1, and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-220-33**~~] **§12-220-32.1 Records. [**~~Records shall be maintained by the boiler~~] The boiler inspection branch shall preserve and maintain for at least six years (6) records [~~for the purpose~~] of [~~preserving~~] reports of its inspections, witnessing of [~~test~~] tests, [~~and~~] accident investigations, correspondence, prints, and memoranda for all objects inspected pursuant to [~~these rules.~~] chapter 397, HRS. [~~These reports of inspections, witnessing of test and accident investigations correspondence, prints, and memoranda shall be maintained for a period of not less than six years.~~] [Eff 7/6/98; §12-220-33; am, ren §12-220-32.1, and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-220-34**~~] **§12-220-33.1 Variances.** (a) In cases of practical difficulties, undue hardships, or new developments, an owner, user, contractor, or vendor may apply for a variance from any [~~boiler~~] safety standard[~~.~~] under this part. The application must be in writing(~~,~~) and may be hand delivered or mailed to the director, or sent by electronic mail to dlir.hiosh.boiler@hawaii.gov, clearly stating the standard from which a variance is sought, the conditions, means, practices, methods, operations, or processes proposed [~~to be used,~~] together with drawings, specifications, and other supporting data. The director may issue an order for variance if what is proposed will provide a substantially equivalent level of safety to that provided by the standard.

(b) All variances granted pursuant to this chapter shall have only a future effect. The director may decline to [~~entertain~~] consider an application for variance on a subject or issue for which a citation has been issued to the owner or user [~~involved~~] and a proceeding on [~~the citation or a related issue concerning] a~~] the proposed citation, or period of abatement, is pending.

(c) Before granting the variance, the director shall post a notice on the division's homepage

notifying all potentially affected parties of the director's intent to grant the variance. The notice shall provide a period of thirty (30) calendar days to object to the granting of the variance, after which time the variance shall become final if no objections are filed and no hearing is requested.

(d) Any party objecting to the granting of the variance must notify the director in writing within thirty (30) days of the online posting, stating the reasons why the variance should not be granted and the resultant specific impact on safety. The objecting party's reasons for objection may also be based on grounds other than impact on public safety, including the feasibility of compliance or lack of undue hardship to the petitioner.

(e) The hearing requested by the objecting party shall be held before the director or the director's authorized agent no later than forty-five (45) days after the thirty-day (30) period online posting of the public notice. It shall be held as follows:

(1) The objecting party or parties and the variance applicant shall be provided notice of the date, time, and place of the hearing at least fourteen (14) calendar days before the scheduled hearing;

(2) Each party shall be prepared to provide evidence supporting the party's case, including a brief oral statement summarizing the party's evidence;

(3) The director shall provide a written order to all parties;

(4) If the director determines that the evidence does not support denial of the variance request, no further notice is required; and

(5) If the director determines that the evidence supports a denial of the variance request, the director shall post notice on the division's homepage notifying all potentially affected parties of the director's determination.

[(~~c~~)] (f) Every final action granting a variance shall be published [~~in a paper of general circulation~~

~~within thirty calendar days following the action. The cost of such publication shall be borne by the petitioning party. Every final action~~] by online posting on the division's webpage. The online notice shall specify the alternative to the standard involved [~~which the particular variance permits.~~] in the variance granted by the director.

[~~(d)~~] (g) If [~~an~~] a variance application filed pursuant to [~~section 12-220-34(a)~~] subsection (a) does not [~~conform to the applicable section,~~] include all the relevant information required, the director may deny the application. [~~Notice~~] The director's order of the denial of an application for nonconformity [~~to the applicable section~~] shall be given to the applicant within thirty (30) calendar days. A notice of denial shall include a brief statement of the grounds for the denial. A denial of an application shall be without prejudice to the filing of another application. If a variance is not acted upon within ninety (90) calendar days, it shall be deemed granted.

[~~(e) Requests for hearing on applications denied. Any affected owner/user may file with the director, in triplicate, a request for a hearing on the application. A request for a hearing filed pursuant to this subsection shall include:~~

~~(1) A concise statement of facts showing how the owner/user would be affected by the relief for which the application was made;~~

~~(2) A specification of any statement or representation in the application which is denied, and a concise summary of the evidence that would be adduced in support of each denial; and~~

~~(3) Any views or arguments on any issue of fact or law presented.~~

~~(f)~~] (h) Notice of hearing.

(1) Upon request for a hearing pursuant to this chapter, the director shall serve [~~reasonable~~] notice of hearing[~~.~~] within thirty (30) days and not more than sixty (60) days after the request for hearing;

(2) A notice of hearing shall include:

(A) The time, place and nature of the hearing;

(B) The legal authority [~~under which~~] for the hearing [~~is to be held~~];

(C) A specification of the issues of fact and law; and

(D) A designation of a hearing [~~examiner~~] officer appointed by the director; and [~~to preside over the hearing.~~]

(3) A copy of [~~a~~] the notice of hearing shall be [~~referred~~] transmitted to the hearing [~~examiner~~] officer together with the original application and any request for a hearing.

(i) The director shall issue a determination to all affected parties within thirty (30) calendar days after the conclusion of the hearing." (Eff 12/6/82; am 12/8/86; am, ren 12-220-11, and comp 12/6/90; am 7/6/98; am 6/19/00; §12-220-34; am, ren 12-220-33.1, and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

EXHIBIT A
INSTALLATION, REPAIR, OR ALTERATION FEES, AND LICENSURE, EXAMINATION, AND REGISTRATION FEES

September 1, 2019

Installation Permits per object:
Power boiler with:

500 square feet or less of heating surface	$350
500 to 3,000 square feet of heating surface	$550
3,001 square feet or more of heating surface	$1,500
Miniature electric boiler	$250
Heating Boiler	$250
Pressure vessel	$200
Sterilizers and steam kettles (Fired and electrically heated)	$200
BEP and NBEP	$300

Repair and Alteration Permits

Routine repair application	$200
Repair application	$300
Alteration application	$500
NBEP repair or alteration	$300

License, Examination and Registration

Certificate of competency examination	$350
Hawaii Commission, initial or renewal	$100
National Board Inspector Commission examination	$500
Quality control systems review for National Board or ASME certificate of authorization[1]	$2,000
Quality control systems review for NBEP Certificate of Authorization[1]	$2,000
Initial applications for OUIO certification	$1,000

[1] ***When administered by the department***

EXHIBIT B
INTERNAL & EXTERNAL INSPECTION FEES

September 1, 2019

Power boilers[1]	
249 square feet or less (internal)	$250
249 square feet or less (external)	$200
>249 to 500 square feet (internal)	$300
>249 to 500 square feet (external)	$200
>500 to 2,999 square feet (internal)	$400
>500 to 2,999 square feet (external)	$250
>2,999 to 10,000 square feet (internal)	$500
>2,999 to 10,000 square feet (external)	$300
>10,000 (internal)	$800
>10,000 (external)	$550
Heating boilers[1]	
Hot-water heating or supply, potable water heater	$160
20 square feet or less low pressure steam	$180
>20 to 100 square feet low pressure steam (internal)	$250
>20 to 100 square feet low pressure steam (external)	$180
>100 to 500 square feet low pressure steam (internal & external)	$300
>500 square feet low pressure steam (external)	$500
Pressure vessels	
Permit renewal	$90
Internal inspection	$175
Inspection reports	
Third-party inspection report review & processing	$30
Permit to operate	
Permit to operate or certificate	$50
State specials	$50
Permit reprint	$30
Miscellaneous	
Ultrasonic testing per hour	$130
Hydrostatic test	$300
Jurisdiction audit fee per hour	$125

The fee for any inspection or service not covered above shall be $125 per hour but not less than $250 during regular working hours and $175 per hour but not less than $350 when outside regular working hours by request.

[1] ***When numbers are specified it is of square feet of heating surface.***

2. Chapter 12-221, Hawaii Administrative Rules, entitled "Existing and New Boilers and Pressure Vessels", is repealed:

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILERS AND PRESSURE VESSELS

CHAPTER 221

EXISTING AND NEW BOILERS AND PRESSURE VESSELS

§12-221-8	Boiler-blowoff equipment
§12-221-9	Location of discharge piping outlets
§12-220-10	Supports
§12-221-11	Clearances
§12-221-12	Exits from boiler room
§12-221-13	Combustion air and ventilation requirements
§12-221-14	Gas burners
§12-221-15	Suggestions for operation
§12-221-16	Use of time clocks prohibited
§12-221-17	Welding
§12-221-18	Ratings for valves, piping, and appurtenances
§12-221-19	Installation requirements

Historical note: Chapter 221 of title 12 is based on chapter 377 of the Hawaii Occupational Safety and Health Standards, Rules and Regulations. [Eff 7/11/74; am 12/30/76; am 8/22/77; am 8/1/78; R 12/6/82]

[~~**§12-221-1 Inspection of boilers and pressure vessels.** All boilers and pressure vessels not exempted by the law or by rules, promulgated under the law, and which are subject to regular inspections, shall be prepared for these inspections as required by the inspector.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-2 Boilers and pressure vessels improperly prepared for inspection.** If a boiler or pressure vessel has not been properly prepared for an internal inspection, or if the owner or user fails to comply with the requirements for a pressure test as set forth in these rules, the inspector may decline to make the inspection or test; and the operating permit shall be withheld or right to operate revoked, until the owner or~~

~~user complies with the requirements.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-221-3 Lap-seam crack.~~** ~~The shell or drum of a boiler or pressure vessel, in which a lap-seam crack is discovered along a longitudinal riveted joint, shall be immediately discontinued from use. Repair~~]~~is prohibited.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS 397-4)

[**~~§12-221-4 Pressure tests. (a)~~** ~~A hydrostatic pressure test, when applied to boilers or pressure vessels, shall not exceed 1-112 times the maximum allowable working pressure, except that boilers of locomotives shall be tested to 1-1/4 times the maximum allowable working pressure. The pressure shall be under proper control so that in no case shall the required test pressure be exceeded by more than 6 per cent.~~

~~(b) During a hydrostatic test, the safety valve or valves shall be removed or each valve disk shall be held to its seat by means of a testing clamp and not by screwing down the compression screw upon the spring. A plug device designed for this purpose may be used.~~

~~(c) The minimum temperature of the water used to apply a hydrostatic test shall not be less than 70° F (21.1° C), and the maximum temperature during inspection shall not exceed 120° F (48.8° C).~~

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

~~(e) When the contents of the vessel prohibit contamination by any other medium or when a hydrostatic test is not possible, other testing media may be used providing the precautionary requirements of the~~

applicable section of the ASME code are followed. In these cases, there shall be agreement between the owner and the inspector.] [Eff 12/6/82; am 12/19/83; am 12/8/86; am and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**§12-221-5 Safety-valve minimum capacity requirements.** The total minimum safety valve capacity in pounds per hour shall be determined on the basis of the pounds of steam generated per hour per square foot of boiler heating surface as given in table 221-1.

TABLE 221-1
MINIMUM POUNDS OF STEAM PER HOUR PER SQUARE FOOT OF HEATING SURFACE

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

Notes:

1. When a boiler is fired only by a gas giving a heat value not in excess of 200 Btu per cubic feet, the minimum safety valve or safety-relief

~~valve relieving capacity may be based on the value given for hand-fired boilers above.~~

2. ~~The minimum safety valve or safety-relief valve relieving capacity for electric boilers shall be 3-1/2 pounds per hour per kilowatt input.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-6 Safety valve stamping requirements.** The marking on safety-relief valves shall be as follows:~~

~~(1)~~ ~~Safety valves for power boilers and fired pressure vessels shall be stamped with "V" symbol within the cloverleaf and letters "NB";~~

~~(2)~~ ~~Hot water safety relief valves shall be stamped with "RV" symbol within the cloverleaf and letters "NB";~~

~~(3)~~ ~~Safety valves for low-pressure steam heating boilers shall be stamped with the "HV" or "V" within the cloverleaf and letters "NB"; and~~

~~(4)~~ ~~Safety valves and safety-relief valves for pressure vessels shall be stamped with the "UV" symbol within the cloverleaf and letters "NB".~~] [Eff 12/6/82; am 12/8/86; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-7 Pressure reducing valves. (a)** Where pressure reducing valves are used, one or more safety or safety-relief valves shall be provided on the low-pressure side of the reducing valve when the piping or equipment on the row-pressure side does not meet the requirements for the full initial pressure. The safety or safety-relief valves shall be located adjoining or as close as possible to the~~

~~reducing valve. Proper protection shall be provided to prevent injury or damage caused by the escaping fluid from the discharge of safety or safety-relief valves if vented to the atmosphere. The combined discharge capacity of the safety or safety-relief valves shall be such that the pressure rating of the lower pressure piping or equipment shall not be exceeded in case the reducing valve fails in the open position.~~

~~**(b)** The use of hand-controlled bypasses around reducing valves is permissible. if a bypass is used around the reducing valve, the safety valve required on the low-pressure side shall have sufficient capacity to relieve all the fluid that can pass through the bypass without overpressuring the low-pressure side.~~

~~**(c)** A pressure gage shall be installed on the low-pressure side of a reducing valve.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-8 Boiler-blowoff equipment. (a)** The blowdown from a boiler or boilers that enters a sanitary sewer system or blowdown which is considered a hazard to life or property shall pass through some form of blowoff equipment that will reduce pressure and temperature so that:~~

~~(1) The temperature of the water leaving the blowoff equipment shall not exceed 150° F; and~~

~~(2) The pressure of the blowdown leaving any type of blowoff equipment shall not exceed 5 psig.~~

~~**(b)** Blowoff equipment shall conform to the provisions set forth in the recommended rules for National Board Boiler Blowoff Equipment.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-9 Location of discharge piping outlets.** The discharge of safety valves, blowoff pipes, and other outlets shall be located and supported so as to prevent injury to personnel.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-10 Supports.** Each boiler and pressure vessel shall be supported by masonry or structural supports of sufficient strength and rigidity to safely support the boiler or pressure vessel and its contents. There shall be no excessive vibration in either the boiler, pressure vessel, or connecting piping.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-11 Clearances.** For boilers and pressure vessels installed prior to January 1986, a recommended clearance of 3 feet between the top of the boiler proper and the ceiling and 3 feet between all sides of the boiler and adjacent walls or other structures should be provided. For all equipment installed after January 1986, refer to applicable sections for specific type of equipment. Boilers and pressure vessels having manholes shall have 5 feet clearance from the manhole opening and any wall, ceiling, or piping that will prevent a person from entering. All boilers and pressure vessels shall be so located that adequate space will be provided for the proper operation of the boilers and pressure vessels and their appurtenances, for the inspection of all surfaces, tubes, watemalls, economizers, piping, valves, and other equipment for their necessary maintenance, repair, and replacement of tubes.~~] [Eff. 12/6/82; am 12/8/86; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-12 Exits from boiler room. (a)** Each boiler room containing one or more boilers with a total of 500 square feet of heating surface or more shall be provided with two exits. These exits shall be remotely located from each other and have doors that open outward. Each elevation in this boiler room shall have two means of exit, each remotely located from the other.~~

~~**(b)** All exits from the boiler room shall be made safe and convenient and kept free and clear at all times.~~] [Eff 12/6/82; am 12/19/83; am 12/8/86; am and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-13 Combustion air and ventilation requirements. (a)** A permanent source of outside air shall be provided for each boiler room to permit satisfactory combustion of the fuel and proper ventilation under normal operating conditions.~~

~~**(b)** The total requirements of the burners for all fired pressure vessel in the boiler room must be used to determine the louver sizes whether fired by coal, oil, or gas. However, the minimum net free louvered area shall not be less than 1 square foot. The following table or formula shall be used to determine the net louvered area in square feet.~~

~~**(c)** When mechanical ventilation is used in lieu of subsection (b) above, the supply of combustion and ventilation air to the boiler room and the firing device shall be interlocked with the fan so the firing device will not operate with the fan off. The velocity of the air through the ventilating fan shall not exceed 500 feet per minute, and the total air delivered shall be equal to or greater than shown in table 221-2.~~

~~**TABLE 221-2**~~

~~**INPUT (BTU/HR)**~~	~~**REQUIRED AIR (CU/FT/MIN)**~~	~~**MIN NET LOUVERED (AREA SQ FT)**~~

~~500,000~~	~~125~~	~~1.0~~
~~1,000,000~~	~~250~~	~~1.0~~
~~2,000,000~~	~~500~~	~~1.6~~
~~3.000,000~~	~~750~~	~~2.5~~
~~4,000,000~~	~~1,000~~	~~3.3~~
~~5,000,000~~	~~1,250~~	~~4.1~~
~~6,000,000~~	~~1,500~~	~~5.0~~
~~7,000,000~~	~~1,750~~	~~5.9~~
~~8,000,000~~	~~2,000~~	~~6.6~~
~~9,000,000~~	~~2,250~~	~~7.5~~
~~10,000,000~~	~~2,500~~	~~8.3~~

~~(BTUH/10,000 x 2.5 = CFM~~]

[Eff. 12/6/82; am 12/8/86; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-14 Gas burners.** For installations which are gas-fired, the burners used shall conform to the applicable requirements of the American Gas Association or the National Fire Protection Association, or equivalent.~~] [Eff 12/6/82; comp 12/6/90, R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-15 Suggestions for operation**. It is suggested that the Recommended Rules for Care of Power Boilers, Section VII, and the Recommended Rules for Care of Heating Boilers, Section VI, of the ASME Code be used as a guide for proper and safe operating practices.~~] [Eff. 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-16 Use of time clocks prohibited**. The use of time clocks or other devices for automatically starting up or shutting down a power boiler or a heating boiler which produces steam shall be prohibited.~~] [Eff. 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-17 Welding**. (a) All welding performed on boilers, pressure vessels, or piping covered by this chapter shall be performed in accordance with the applicable sections of the ASME Boiler and Pressure Vessel Code and ASME B31.1.~~

~~(b) Each employer or self-employed welder shall record in detail and shall qualify the procedure specifications for any welding procedures. All welding performed in qualifying a welding procedure shall be done in accordance with the procedure qualification.~~

~~(c) Each welder and welding operator who welds on vessels or piping covered by this chapter shall pass a test described in the applicable code for performance qualification. The essential variables and test results obtained by each welder and welder operator shall be recorded in the performance specification. Each employer or self-employed welder shall maintain a record of procedures, including the essential variables, under which welders and welder operators are examined, and the results of the examination.~~

~~(d) Forms for recording the necessary information for welding procedure specifications (WPS, QW-200.1), procedure qualification records (PQR, QW-200.2), and welder performance qualifications (WPQ, QW-301) shall be those suggested in the applicable codes noted in subsection (a) or other types approved by the department. These records shall be certified by the employers of contracted welders and shall be accessible to the authorized inspectors.~~] [Eff 12/6/82; am 12/8/86; am

and comp 12/6/90; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-18 Ratings far valves, piping, and appurtenances.** Each valve, pipe, and appurtenance shall be capable of withstanding the maximum working pressure and temperature of the boiler or pressure vessel on which it is installed.~~] [Eff. 12/19/83; comp 12/6/90, R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-221-19 Installation Requirements**. For all new installations of boilers and pressure vessels the requirements in the National Board Inspection Code, Part 1, shall be followed.~~]" [Eff 11/18/12, R] (Auth: HRS §397-4) (Imp: HRS §397-4)

3. Chapter 12-221.1 Hawaii Administrative Rules, entitled "Existing Pressure Retaining Items", is adopted to read as follows:

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILER AND PRESSURE VESSELS

CHAPTER 221.1

EXISTING PRESSURE RETAINING ITEMS

Historical Note: This chapter is based substantially upon chapter 12-221. [Eff 12/6/82; am 12/19/83; am 12/8/86; am and comp 12/6/90; am 11/18/12 R]

§12-221.1-1 Inspection of pressure retaining items. All pressure retaining items, unless exempt by the law or this part, shall be inspected in accordance with the NBIC Part 2 and the requirements of this part. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-221.1-2 Pressure retaining items improperly prepared for inspection. If a pressure retaining item is not properly prepared for a required inspection, or if the owner or user fails to comply with the inspection requirements, the inspector may decline to make the inspection or test. The operating permit shall be withheld, or right to operate revoked, until the owner or user complies with the requirements. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-221.1-3 Lap seam crack. The shell or drum of a boiler in which a lap seam crack is discovered along a longitudinal riveted joint must be immediately discontinued from use. Repair of the shell or drum is prohibited. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-221.1-4 Boiler blowoff equipment. (a) The blowdown from a boiler or boilers that enters a sanitary sewer system or blowdown that is considered

a hazard to life or property shall pass through some form of blowoff equipment that will:

(1) Prevent water exceeding 150 degrees Fahrenheit from leaving the blowoff equipment; and

(2) Prevent the pressure leaving the blowdown of any blowoff equipment to exceed five (5) psig.

(b) Blowoff equipment shall conform to the provisions set forth in NB-27 "A Guide to Blowoff Vessels". [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-221.1-5 Clearances. The following shall apply to clearances:

(1) For pressure retaining items installed prior to January 1986, a recommended clearance of three (3) feet between the top of the boiler proper and the ceiling and three (3) feet between all sides of the boiler and adjacent walls or other structures is required;

(2) For all pressure retaining items installed after January 1986, refer to applicable chapters in this part for the specific type of equipment;

(3) Pressure retaining items having manholes shall have at least five (5) feet clearance from the manhole opening and any wall, ceiling, or piping to permit egress or entry;

(4) All pressure retaining items shall have adequate space for their proper operation, including appurtenances; and

(5) All pressure retaining items shall have adequate space to facilitate the inspection necessary, maintenance, repair, and replacement of all tubes, waterwalls, economizers, piping, valves, and other equipment for their necessary maintenance

and repair. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-221.1-6 Use of time clocks prohibited. The use of time clocks or other devices for automatically starting up or shutting down a power boiler or a heating boiler which produces steam shall be prohibited." [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

4. Chapter 12-222, Hawaii Administrative Rules, entitled "Power Boilers", is repealed.

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILER AND PRESSURE VESSELS

CHAPTER 222

POWER BOILERS

Historical note: Chapter 222 of title 12 is based on chapter 377 of the Hawaii Occupational Safety and Health Standards, Rules and Regulations. [Eff. 7/11/74; am 12/30/76; am 8/22/77; am 8/1/78; R 12/6/82]

[**~~§12-222-1 Age limit of existing power boilers.~~** ~~The age limit of any boiler having lap-riveted·longitudinal joints and operating at a pressure in excess of 50 psig shall be 20 years, This type of boiler, when removed from an existing setting, shall not be reinstalled for a pressure in excess of 15 psig. A reasonable time for replacement, not to exceed one year, may be given at the discretion of the department.~~] [Eff. 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-2 Maximum allowable working pressure for standard boilers.~~** ~~(a) The maximum allowable working pressure for standard boilers shall be determined in accordance with the applicable provisions of the edition of the ASME code under which they were constructed and stamped.~~

~~(b) Power boilers designed and stamped in accordance with Section I of the ASME Code, if trimmed for use as low pressure steam boilers, shall be inspected internally and externally on a~~

~~power boiler frequency. The steam supply piping, blowdown piping, and safety valve discharge piping shall be installed in accordance with ASME B31.1.~~]
[Eff 12/ 6/8 2; comp 12 / 6 /90; R]
(Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-3 Safety valves~~**. ~~(a) The use of weighted-lever safety valves or safety valves having either the seat or disk of cast iron is prohibited; valves of this type of construction shall be replaced by direct, spring-loaded, pop-type valves that conform to the requirements of the ASME Code section I and are stamped in accordance with section 12-221-6. These requirements are briefly summarized below.~~

~~(1)~~ ~~Each boiler shall have at least one ASME and National Board certified safety valve. If it has more than 500 square feet of water-heating surface, or an electric power input of more than.1100 kw, it shall have two or more safety valves of the same type.~~

~~(2)~~ ~~The valve or valves shall be connected to the boiler, independent of any other steam connection, and attached as close as possible to the boiler, without unnecessary intervening pipe or fittings. Where alteration is required to conform to this requirement, owners or users shall be allowed reasonable time in which to complete the work as permitted by the department.~~

~~(3)~~ ~~No valves of any description shall be placed between the safety valve and the boiler nor on the discharge pipe, if used, between the safety valve and the atmosphere. When a discharge pipe is used, it shall be at least full size of the safety-valve discharge and fitted with an open drain to prevent water lodging in the upper part of the safety valve or in the discharge pipe. Sectional areas of~~

a discharge pipe shall not be less than the full area of the valve outlets discharging thereinto and the discharge pipe shall be as short and straight as possible and so arranged as to avoid undue stresses on the valve or valves. When an elbow is placed on a safety-valve discharge pipe, it shall be located close to the safety-valve outlet or the discharge pipe shall be anchored and supported securely. When the umbrella or drip pan type of connection is used, the discharge piping shall be so designed as to prevent binding due to expansion. All safety-valve discharges shall be so located or piped as to be carried clear from walkways or platforms.

(4) The safety-valve capacity of each boiler shall be such that the safety valve or valves will discharge all the steam that can be generated by the boiler without allowing the pressure to rise more than 6 per cent above the highest pressure to which any valve is set, and in no case to mo.re than 6 per cent above the maximum allowable working pressure. Table 221-1 in section 12-221-5 may be used to determine the required total capacity.

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

(6) When two or more boilers, operating at different pressures, and safety-valve settings are interconnected, the lower

~~pressure boilers or interconnected piping shall be equipped with safety valves of sufficient capacity to prevent overpressure, considering the maximum generating capacity of all boilers.~~

~~(7) When a boiler is fed from a water source other than a feed pump or injector, the maximum safety-valve setting on the boiler shall be no more than 80 per cent of the minimum pressure of the source.~~

~~(b) When a new boiler is installed form P-7, Manufacturer's Data Report for Pressure Relief Valves, or P-8, Manufacturer's or Assembler's Certificate of Conformance for Pressure Relief Valves, as required by the provisions of the ASME Code rules for power boilers, shall be submitted along with the manufacturer's data on the power boiler.~~] [Eff 12/6/82; am 12/19/83; am and comp 12/6/90; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-4 Boiler feeding~~**. ~~(a) Each boiler shall have a feed supply which will permit it to be fed at any time while under pressure.~~

~~(b) Feed supply line shall be equipped with a feed check or non-return valve.~~] [Eff 12/6/82; am and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-5 Water level indicators~~**. ~~(a) No outlet connections (except for damper regulator, feedwater regulator, low-water fuel cutout, drains, steam gages, or apparatus that does not permit the escape of an appreciable amount of steam or water) shall be placed on the piping that connects the water column to the boiler. The water column shall be provided with a valved drain of at least 3/4-inch~~

~~pipe size, with the discharge piped to a safe location.~~

~~(b) Each boiler shall have three or more gage cocks located within the visible length of the water glass, except when the boiler has two water glasses located on the same horizontal line. Boilers not over 36 inches in diameter, in which the heating surface does not exceed 100 square feet, need only two gage cocks.~~] [Eff 12/6/82; am and comp 12/6/90, R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-6 Pressure gages~~**. ~~(a) Each steam boiler shall have a pressure gage with a dial graduated to approximately double the pressure at which the safety valve is set, but in no case to less than 1-1/2 times this pressure, connected to the steam space or to the steam connection to the water column. The pressure gage shall be connected to a siphon or equivalent device of sufficient capacity to keep the gage tube filled with water. A valve or cock shall be placed in the gage connection adjacent to the gage.~~

~~(b) The connections to the boiler, except the siphon, if used, shall not be less than 1/4-inch standard pipe size; but, where steel or wrought iron pipe or tubing is used, they shall not be less than 1/2-inch (13 mm) inside diameter.~~

~~(c) . Each boiler shall be provided with a valve connection at least 1/4-inch pipe size for the exclusive purpose of attaching a test gage when the boiler is in service, so that the accuracy of the boiler pressure gage can be ascertained.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-7 Stop valves~~**. ~~(a) Each steam outlet from a boiler (except safety-valve and water-column~~

~~connections) shall be fitted with a stop valve located as close as practicable to the boiler.~~

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

~~(c) When boilers provided with manholes are connected to a common steam main, the steam connection from each boiler shall be fitted with two stop valves having an ample free-flow drain between them. The discharge of this drain shall be visible to the operator while manipulating the valve.~~] [Eff 12/6/82; am and comp 12/6/90, R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-8 Blowoff connection~~**. ~~(a) The construction of the selling around each blowoff pipe shall permit free expansion and contraction. Careful attention shall be given to the problem of sealing these setting openings without restricting the movement of the blowoff piping.~~

~~(b) All blowoff piping, when exposed to furnace heat, shall be protected by fire-brick or other heat-resisting material, so constructed that the piping may be inspected readily.~~

~~(c) Each boiler shall have a blowoff pipe, fitted with a valve or cock, in direct connection with the lowest water space. Cocks shall be of the gland or guard type and suitable for the pressure allowed. The use of ordinary globe valves shall not be permitted. When the maximum allowable working pressure exceeds 100 psig, each blowoff pipe shall be provided with 2 valves or a valve and cock at least one of which shall be a slow-opening valve. On a boiler having multiple blowoff pipes, a single master valve may be placed on the common blowoff pipe from the boiler, in which case only one valve on each individual blowoff is required. In that case, either~~

~~the master valve or the individual valves shall be slow-opening type.~~

~~(d) When the maximum allowable working pressure exceeds 100 psig, blowoff piping shall be at least extra heavy steel from the boiler to the valve or valves and shall be run full size without use of reducers or bushings. The piping shall not be galvanized.~~

~~(e) All fittings between the boiler and blowoff valves shall be of steel. Renewal of blowoff pipes or fittings shall be installed in accordance with the rules for new installations. See National Board rules for blowoff equipment.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-9 Repairs and renewals of boiler fittings and appliances.~~** ~~Whenever repairs are made to fittings or appliances or it becomes necessary to replace them, the work shall comply with the requirements for new installations. The use of galvanized piping is prohibited.~~] [Eff 12/6/82; am 12/19/83; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-10 Attendance on power boilers~~**. ~~(a) Power boilers, waste heat boilers, and high-temperature water boilers subject to this chapter shall not be left in operation unattended by a competent attendant for a period of time longer than it will take the water level to drop from a normal operating level to the lowest permissible water level, as indicated by the water gauge glass or by indicating devices or recorders, when the feed water is shut off and the boiler is forced to its maximum capacity, unless all of the following are complied with where applicable.~~

~~(1) The boiler is equipped with a strobe or flashing light that will operate when the water reaches the lowest permissible operating level or, for boilers having no fixed steam or water line, when the highest permissible operating temperature is reached. The strobe or flashing light shall be so located that it can be plainly seen at the most remote point from the boiler at which the attendant is required to work. Audible alarms·, when used, shall be distinctly audible above the ambient noise level.~~

~~(2) The boiler is equipped with two low water safety devices with separate water connections to the boiler that will shut off the fuel to the burner or burners when the water reaches the lowest permissible operating level or, for boilers having no fixed steam or water line, when the highest permissible operating temperature is reached. These devices shall require manual resetting unless the burner is equipped with a full safety pilot control.~~

~~(3) A competent attendant personally checks the operation of the boiler, the necessary auxiliaries, and the water level of the boiler at such intervals, not exceeding 60 minutes, as necessary to insure the safe operation of the boiler. The operation of the automatic water level controls shall be tested such that fuel to the burner will be shut off at the beginning of each daily period of operation and at intervals not to exceed 12 operating hours. A record of each inspection and check of controls shall be maintained and available to the inspector for a period of six months.~~

~~(4) There is a conspicuous .and readily accessible safety disconnect switch located adjacent to the boiler room entrance or, in the situation where the boiler is located~~

~~outside, in the immediate vicinity of the boiler which, when operated, will cut off all power to the boiler and cause it to be shut down in a safe manner. Immediately adjacent to the disconnect device there shall be posted a sign of arresting size and design directing the observer to use the device for shutting down the boiler in event of emergency, such as observing any unsafe condition or functioning of the boiler or its appurtenances or any condition or function of the boiler which is unusual or which is, in the observer's opinion, potentially hazardous.~~

~~(b) A competent attendant means a person who is familiar with the boiler to be operated and who has been registered by the owner or user, and has been certified by a curriculum accredited college, university, technical school, or organization serving the boiler industry.~~

~~(c) The minimum standards to be met for an attendant to be competent include, but are not limited to the following, as detailed in the ASME Code Section VII.~~

~~(1) The ability to:~~

~~(A) Explain the function and operation of all controls on the boiler; and~~

~~(B) Light off the boiler in a safe manner;~~

~~(2) The knowledge of:~~

~~(A) All possible methods of feeding water to the boiler;~~

~~(B) How to blow down the boiler in a safe manner;~~

~~(C) What would happen and what to do in the event the water in the boiler was carried to high or low; and~~

~~(D) How to shut down the boiler or boilers in a safe manner.~~

~~(3) Access to a hard copy of the ASME Code Section VII and ASME CSD-1, or a CD or other data storage device which contains both publications, or electronic media, and~~

~~the ability to demonstrate familiarity with the data and its retrieval.~~] [Eff 12/5/82; am 12/19/83; am and comp 12/6/90; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-11 Conditions not treated in these requirements~~**. ~~All cases not specifically treated by these requirements shall be regarded as new installations or may be referred to the department for instructions concerning the requirements.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-222-12 Clearances~~**. ~~(a) When power boilers, or high-temperature water boilers, and their appurtenances are installed, a minimum height of 3 feet shall be provided between the top of the boiler proper and the ceiling and 3 feet between all sides of the boiler and adjacent walls or other structures.~~

~~(b) Boilers having manholes shall have 5 feet clearance from the manhole opening and any wall, ceiling, or piping that will prevent a person from entering.~~

~~(c) All boilers shall be so located that adequate space will be provided for the proper operation of the boilers and their appurtenances; for the inspection of all surfaces, tubes, waterwalls, economizers, piping, valves, and other equipment; and for their necessary maintenance, repair, and replacement of tubes.~~] [Eff 12/8/86; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-222-13 Controls and safety devices for automatically fired boilers.** The Provisions of ASME CSD-1 shall apply to the types of controls and safety devices for automatically-fired, high-pressure steam boilers and/or forced circulation boilers.~~]" [Eff and comp 12/6/90; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

5. Chapter 12-222.1, Hawaii Administrative Rules, entitled "Power Boilers", is adopted to read as follows:

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILER AND PRESSURE VESSELS

CHAPTER 222.1

POWER BOILERS

Historical Note: This chapter is based substantially upon chapter 222. [Eff 7/11/74; am 12/30/76; am 8/22/78; am 8/1/78; am 12/6/82; R]

§12-222.1-1 Scope. Unless exempt under section 12-220-2.1(c), the requirements in this section shall apply to power boilers and high-temperature water boilers, but not limited to the following:

(1) Boilers in which steam or other vapor is generated at a pressure of more than fifteen (15) psig for use external to itself;

(2) High-temperature water boilers intended for operation at pressures exceeding one hundred sixty (160) psig or temperatures exceeding two hundred fifty (250) degrees Fahrenheit; and

(3) Unfired steam boilers designed in accordance with ASME BPVC Section I.

[Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-2 General requirements for power boilers. (a) The following shall apply to all power boilers:

(1) All power boilers in operation in this jurisdiction shall have a valid and current

operating permit issued for a specific location by the department;

(2) Changes in location or ownership shall require notification of the department and may require re-inspection;

(3) Power boilers shall bear the ASME BPVC symbol stamp "S", "E", "M", or ASME certification mark with "S", "E", or "M" designator and the National Board registration number;

(4) ASME and NB stamping shall be legible and not be concealed by insulation or paint; and

(5) Upon completion of the installation of a new power boiler, each power boiler shall be marked by an inspector employed by the department with a state serial number, consisting of letters and figures to be not less than five sixteenths (5/16) of an inch in height and arranged as HAW####-Year.

(b) The age limit of boilers of standard construction installed prior to the date these rules become effective shall be dependent on thorough internal and external inspection, and where required by the inspector, a pressure test not exceeding one and one-half times (1.5) the maximum allowable working pressure. If the boiler, under these test conditions, exhibits no distress or leakage, it may be continued in operation at the working pressure determined by the applicable provisions of the edition of the ASME BPVC under which they were constructed and stamped.

(c) The age limit of any boiler of nonstandard construction without a lap-riveted longitudinal joint, installed prior to the date these rules become effective, shall be thirty (30) years, unless the department determines it may continue in operation at a pressure determined by the department as long as the following apply:

(1) The boiler passes a thorough internal and external inspection; and

(2) If required by an inspector, it passes a pressure test not exceeding one and one-half (1.5) times the maximum allowable working pressure, held for a period of at least thirty (30) minutes during which no distress or leakage develops.

(d) The age limit of any existing nonstandard boiler having lap-riveted longitudinal joints and operated at a pressure in excess of fifty (50) psig shall be twenty (20) years. This type of boiler, when removed from an existing setting, shall not be reinstalled and used at a pressure in excess of fifteen (15) psig. A reasonable time for replacement, not to exceed one (1) year, may be given at the discretion of the department. Lap seam riveted boilers are not allowed in this jurisdiction.

(e) Power boilers designed and stamped in accordance with ASME BPVC Section I, if trimmed for use as low pressure steam boilers, shall be inspected internally and externally on a power boiler frequency, if any of the following is exceeded:

(1) Heating surface greater than 100 square feet;

(2) Heat input greater than 400,000 Btu/hr; or

(3) Power boilers with manways.

(f) The following shall be considered new boiler installations:

(1) Replacement of an existing power boiler;

(2) Replacement of boilers at an existing location with a used or second-hand boiler; and

(3) Used or second-hand power boilers when installed in this jurisdiction, shall be equipped with fittings and appurtenances that comply with new installations.

(g) Replacement or repairs to boiler fittings, appurtenances or appliances, controls, and safety devices, shall comply with the applicable ASME BPVC and National Board Inspection Codes.

(h) Weld repairs, alterations, and inspection records shall be submitted with the installation application.

(i) All boiler piping shall be designed and installed in accordance with ASME BPVC Section I and ASME B31.1 for used or second-hand boilers. The use of galvanized piping is prohibited for power boiler pressure piping. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-3 Responsibilities of owners and users. (a) The following are requirements of owners and users:

(1) The owner or user of the power boiler is responsible for ensuring that all equipment meets all the requirements of the jurisdiction at the point of installation, including licensing, registration, and certification of those performing installations;

(2) Owners or users shall ensure operating permit renewal inspections are completed prior to the permit expiration date;

(3) Owners or users shall schedule boiler permit renewal internal inspections. Permit renewal inspections shall include boiler shutdown, dismantling, an internal inspection by an inspector, testing of controls and safety devices, and any additional inspection requirements at the discretion of the inspector;

(4) Operation of power boilers with expired operating permits is not allowed and may be subject to citation with penalties of up to $10,000 per day pursuant to section 12-220-22;

(5) When a boiler task is required, it is the owner or the owner's designee that is expected to perform the task, however, the owner retains responsibility for compliance; and

(6) Owners or users are responsible to ensure compliance with the preventive maintenance requirements as specified in 12-222.1-14.

(b) Permit extensions. The following shall apply to permit extensions:

(1) Requests for the extension of operating permits may be considered for valid reasons by submitting a written request to the chief boiler inspector; and

(2) The unavailability of special inspectors to conduct inspections is not a valid reason for requesting permit extensions as deputy boiler inspectors may perform the inspections in the absence of special inspectors; [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-4 Inspections. (a) Initial power boiler acceptance inspections shall be conducted and witnessed by an inspector employed by the department. The initial inspection shall include internal inspection, post installation pressure test in accordance with the original code of construction, and operational testing of controls and safety devices by the installer, contractor, or owner. The tests shall conform to the procedures set forth in the ASME BPVC, NBIC, and this section.

(b) All power boilers require annual inspection, including an internal inspection, and if approved by the department, the owner or user shall receive an operating permit. Approximately six (6) months after an initial or annual inspection, power boilers shall be externally inspected and operationally tested. The owner or user or designee shall perform the operational testing with an inspector witnessing the testing.

(c) The owner or user or designated agent shall prepare each boiler for internal inspection prior to the expiration date of the operating permit and shall apply a hydrostatic or pressure test, whenever

necessary, at a time mutually agreeable to the inspector and owner or user. The owner or user of a boiler, or designated agent, shall prepare the boiler or pressure vessel for internal inspection to include, but not limited to the following, at the discretion of the inspector:

(1) Drawing off the water and thoroughly washing the boiler;

(2) Removing plates for a manhole or handhole, washout plugs, and inspection plugs in the connections of the water column, and in internally fired boilers all grates;

(3) Ensuring the furnace and combustion chambers are thoroughly cooled and cleaned;

(4) Removing brickwork or installation as required by the inspector to determine the condition of the boiler, headers, furnace, supports, and other parts;

(5) Testing the pressure gage at the discretion of the inspector;

(6) Preventing any leakage of steam or hot water into the boiler by disconnecting the pipe or valve at the most convenient point, or by any method approved by the inspector;

(7) Closing, tagging, and padlocking the non-return valve, steam stop valves, blowoff valves, and feed valves before opening the cover for a manhole or handhole and entering any parts of the boiler or pressure vessel that connect to a common header with other boilers. In addition, opening the drain valves or cocks located between valves, disconnecting blowoff lines where practical between pressure parts and valves, and opening all drains and vent lines; and

(8) Any additional requirements at the discretion of the inspector.

(d) The following shall apply to these specific types of boilers or pressure vessels:

(1) Miniature boilers shall be externally inspected and operationally tested biannually; and
(2) Miniature and electric steam boilers providing steam for sterilizing chambers shall be inspected and permitted separately from the steam chamber.
(e) Additional inspection requirements:
(1) The inspector may require any additional inspections at their discretion when deemed necessary for continued safety;
(2) The owner or user shall develop safety policies and procedures for entering boiler confined space before any inspection, testing, or operation; and
(3) The owner or user shall enforce a lockout tagout safety procedure as approved by the inspector when any person enters any confined space. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-5 Technical installation requirements. (a) General requirements. The following shall apply to all power boilers:
(1) Power boilers shall be installed pursuant to section 12-220-2.1 and this chapter;
(2) Owners and users shall adhere to the power boiler installation requirements as specified in NBIC Part 1, and this chapter;
(3) An application for installation permit shall be submitted to the department prior to commencement of work;
(4) Boilers installed without an installation permit may be subject to citation and penalties of up to $10,000 per day pursuant to section 12-220-22;
(5) Only contractors holding a valid Hawaii

C-4 contractor license issued by the contractors license board of the department of commerce and consumer affairs shall install power boilers; and

(6) All power boilers shall be equipped with controls and safety devices based upon the Btu/hr burner input, as specified in the original code of construction, and in accordance with the following codes and standards:

(A) Boilers with energy input ratings of less than 12,500,000 Btu/hr shall meet the requirements of ASME CSD-1-2012;

(B) Boilers with energy input ratings of 12,500,000 Btu/hr and above shall meet the requirements of NFPA-85-2015;

(C) All atmospheric fluidized bed boilers, boilers with pulverized fuel systems, and boilers that are stoker fired shall meet the requirements of NFPA-85-2015; and

(D) No new miniature boiler shall be installed unless it has been constructed and inspected to ASME BPVC standards, bears the ASME certification mark with the "S", "M", or "E" designator in accordance with the requirements of Part PMB of ASME BPVC Section I, and when required, has controls and safety devices installed that are in accordance with ASME CSD-1-2012.

(b) First acceptance inspection and certification requirements shall include the following:

(1) The owner, user, and contractor shall comply with section 12-220-2.1, and upon completion of the installation shall arrange for an acceptance inspection by the department;

(2) The installing contractor shall operationally test the boiler controls and

safety devices prior to scheduling the first acceptance inspection with the department and record the results on form CG-500, ASME CSD-1 2012, and file a copy with the department;

(3) First inspections for power boilers shall include internal inspection, pressure test in accordance with the original code of construction, and operational testing of the controls and safety devices;

(4) The installing contractor shall test the boiler as directed and witnessed by an inspector employed by the department;

(5) An inspector employed by the department shall conduct the first data inspection, acceptance, and mark the state serial number on the power boiler pursuant to section 12-220-29.1; and

(6) The installer shall complete and certify the NBIC Boiler Installation Report I-1 (NB-365, see Exhibit 3), found at the end of this chapter, after the completion, inspection, and acceptance of the installation. The Boiler Installation Report I-1 (NB-365, see Exhibit 3) shall be submitted to the owner and the department.

(c) The following shall apply to power boiler clearances:

(1) Boiler installations shall allow for normal operation, maintenance, and inspections. There shall be at least thirty-six (36) inches of clearance on each side of a boiler to enable access for maintenance and inspection activities. Boilers operated in battery shall not be installed closer than forty-eight (48) inches from each other. The front or rear of any boiler shall not be located closer than thirty-six (36) inches from any wall or structure;

(2) Alternative clearances in accordance with the manufacturer's recommendations are subject to acceptance by the department;
(3) Boilers shall be installed to allow for removal and installation of tubes;
(4) Boilers with a top-opening manhole shall have at least eighty-four (84) inches of unobstructed clearance above the manhole to the ceiling of the equipment room; other manhole openings shall have at least five (5) feet; and
(5) Boilers with a bottom opening used for inspection or maintenance shall have at least twelve (12) inches of unobstructed clearance.

(d) The following shall apply to electric and miniature boiler clearances:
(1) Electric and miniature boilers shall be installed at an accessible location for inspection and maintenance;
(2) Electric and miniature boilers shall not be installed in ceilings unless provided with permanent ladders, floors, and height clearance for safe access;
(3) Control sides and door openings shall have three (3) feet clearance from any type of interference;
(4) All other sides shall have eighteen (18) inches of clearance; and
(5) Alternative clearances in accordance with the manufacturer's recommendations are subject to acceptance by the department.

[Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-6 Pressure relief valves for power boilers. (a) General requirements. The following shall apply to all power boilers:
(1) Each power boiler, miniature boiler, electric boiler, and high-temperature water

boiler shall have at least one ASME and NB certified pressure relief valve marked with the ASME certification mark and "V" designator, and National Board NB symbols;

(2) When a new boiler is installed, ASME Form P-7 Manufacturer's Data Report for Pressure Relief Valves, or ASME Form P-8 Manufacturer's or Assembler's Certificate of Conformance for Pressure Relief Valves, as required by the ASME BPVC, shall be submitted along with the manufacturer's data on the power boiler;

(3) Only direct spring-loaded pressure relief valves or pilot operated pressure relief valves designed to relieve steam shall be used for steam service;

(4) Safety relief valves are valves designed to relieve either steam or water, depending on the application;

(5) Deadweight or weighted-lever pressure relief valves shall not be used;

(6) For high-temperature water boilers, safety relief valves shall have a closed bonnet, and valve bodies shall not be constructed of cast iron;

(7) At least one NB capacity certified pressure relief valve shall be installed on the boiler. If the boiler has more than 500 square feet of heating surface, or if an electric boiler has a power input of more than 1,100 kilowatts, two or more NB capacity certified pressure relief valves shall be installed;

(8) The pressure relief valve capacity for each boiler shall be so that the valve or valves will discharge all the steam that can be generated by the boiler without allowing the pressure to rise more than six per cent (6%) above the highest pressure to which any valve is set, and in no case to more than six per cent (6%) above the maximum allowable working pressure of the boiler.

In no case shall the minimum relieving capacity be less than the maximum designed steaming capacity as determined by the manufacturer;

(9) One or more pressure relief valves on the boiler proper shall be set at or below the maximum allowable working pressure. If additional valves are used, the highest pressure setting shall not exceed the maximum allowable working pressure by more than three per cent (3%). The complete range of pressure settings of all the pressure relief valves on a boiler shall not exceed ten per cent (10%) of the highest pressure to which any valve is set;

(10) Adjustments, repairs, and reconditioning of pressure relief valves shall be done by a National Board authorized "VR" repair company. The "VR" repair company shall affix a "VR" nameplate to the valve and provide repair documentation and the owner and user shall ensure that the nameplate identification plates remain legible; and

(11) The owner and user shall maintain all pressure relieving devices in good operating condition. When the valves cannot be tested in service, the user shall maintain and make available to the inspector records showing the test dates and set pressure for the valves.

(b) Installation of pressure relief valves. The following shall apply to the installation requirements of pressure relief valves:

(1) Every boiler shall have outlet connections for the pressure relief valve, or valves, independent of any other outside steam connection, and the area of opening shall be at least equal to the aggregate areas of inlet connections of all the attached pressure relief valves. An internal collecting pipe, splash plate, or pan should be used, provided the total area for

inlet of steam is not less than twice the aggregate areas of the inlet connections of the attached pressure relief valves. The holes in such collecting pipes shall be at least 1/4 inch in diameter, and the least dimension in any other form of opening for inlet of steam shall be 1/4 inch. If pressure relief valves are attached to a separate steam drum or dome, the opening between the boiler proper and the steam drum or dome shall be not less than ten (10) times the total area of the pressure relief valve inlet;

(2) Every pressure relief valve shall be connected to stand in an upright position with spindle vertical;

(3) The opening or connection between the boiler and the pressure relief valve shall have at least the area of the valve inlet and the inlet pipe to the pressure relief valve shall be as short and straight as possible, no longer than twice the center-to-end (face) dimension of a corresponding tee fitting of the same diameter, pressure class, and connection type. When a discharge pipe is used, the cross-sectional area shall not be less than the full area of the valve outlet or of the total of the areas of the valve outlets. It shall be as short and straight as possible and arranged to avoid undue stresses on the valve or valves;

(4) When a pressure relief valve is exposed to outdoor elements that may affect operation of the valve, the valve may be shielded with a cover. The cover shall be properly vented and arranged to permit servicing and normal operation of the valve;

(5) No valves of any type except a changeover valve as defined below, shall be placed between the pressure relief valves and the

boiler, nor on the discharge pipe between the pressure relief valves and the atmosphere. A changeover valve, which allows two redundant pressure relief valves to be installed for the purpose of changing from one pressure relief valve to the other while the boiler is operating, may be used provided the changeover valve is in accordance with the original code of construction. It is recommended that the department be contacted to determine the acceptability of changeover valves on boiler applications. The changeover valve shall be designed such that there is no intermediate position where both pressure relief valves are isolated from the boiler;

(6) When two or more pressure relief valves are used on a boiler, they should be mounted either separately or as twin valves made by placing individual valves on Y-bases, or duplex valves having two valves in the same body casing. Twin valves made by placing individual valves on Y-bases or duplex valves having two valves in the same body shall be of equal size;

(7) When two valves of different sizes are installed singly, the relieving capacity of the smaller valve shall not be less than fifty per cent (50%) of that of the larger valve; and

(8) When a boiler is fitted with two or more pressure relief valves on one connection, this connection to the boiler shall have a cross-sectional area not less than the combined areas of inlet connections of all the pressure relief valves with which it connects.

(c) Discharge pipe. The following shall apply to pressure relief valve discharge piping requirements:

(1) All pressure relief valves shall be piped to a safe point of discharge so located or piped as to be carried clear from running boards or platforms. Provision for an ample gravity drain shall be made in the discharge pipe at or near each pressure relief valve, and where water or condensation may collect. Each valve shall have an open gravity drain through the casing below the level of the valve seat. For iron and steel-bodied valves exceeding NPS 2, the drain hole shall be tapped not less than NPS 3/8;

(2) Discharge piping from pressure relief valves on high-temperature water boilers shall have adequate provisions for water drainage as well as steam venting;

(3) If a muffler is used on a pressure relief valve, it shall have sufficient outlet area to prevent back pressure from interfering with the proper operation and discharge capacity of the valve. The muffler plates or other devices shall be so constructed as to avoid a possibility of restriction of the steam passages due to deposits. Mufflers shall not be used on high-temperature water boiler pressure relief valves; and

(4) When a discharge pipe is used, it shall be at least the same size of the safety valve discharge port and fitted with an open drain to prevent water lodging in the upper part of the safety valve or in the discharge pipe. Sectional areas of a common discharge pipe shall not be less than the same size of the combined multiple valve outlets discharging into the common discharge pipe. The discharge pipe shall be as short and straight as possible and arranged to avoid undue stresses on the

valve or valves. Discharge pipe elbows shall be placed close to the safety valve outlet, or the discharge pipe shall be anchored and supported securely. If umbrella type drip pan connection is used, the discharge piping shall be designed to prevent binding due to expansion. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-7 Power boiler appurtenances. (a) Water level indicators. The following shall apply to all water level indicators:

(1) Each boiler shall have at least one water gage glass, except forced-flow steam generators with no fixed steam and waterline and high-temperature water boilers of the forced circulation type that have no steam and waterline;

(2) The lowest visible water level in a gage glass shall be at least two inches above the lowest permissible water level as determined by the manufacturer;

(3) Gage glasses shall be connected directly to the shell or drum of the boiler or to an intervening water column;

(4) The lower edge of the steam connection between a water column, gage glass, or water level sending device in the boiler, shall not fall below the highest visible water level in the gage glass. In addition, there shall be no sag of offset in the piping that will permit accumulation of water;

(5) The upper edge of the water connection between water column, gage glass, or water level sensing device in the boiler, shall not be above the lowest visible water level in the gage glass. In addition, no part of

the pipe connection shall be above the point of connection at the water column;

(6) Boilers having a maximum allowable working pressure of 400 psi or less shall always have at least one gage glass in service;

(7) Boilers having maximum allowable working pressure greater than 400 psi shall always have two gage glasses in service:

(A) When two gage glasses are required, both may connect to a single water column;

(B) Instead of one of the two required gage glasses, two independent remote water level indicators (two discrete systems that continuously measure, transmit, and display water level) may be provided. In addition, minimum water levels shall be clearly marked;

(C) When both remote level indicators are in reliable operation, the remaining gage glass may be shut off, but shall be maintained in serviceable condition; and

(D) When the water level in at least one gage glass is not readily visible to the operator in the area where control actions are initiated, either a fiber optic cable (with no electrical modification of the optical signal) or mirrors shall be provided to transfer the optical image of the water level to the control area. Alternatively, any combination of two of the following shall be provided:

(i) An independent remote water level indicator; and

(ii) An independent continuous transmission and display of an image of the water level in a gage glass. The display of a remote water level indicator shall have a clearly marked minimum water

level reference at least two (2) inches above the lowest permissible water level, as determined by the manufacturer;

(8) Gage glass assemblies with multiple sections, whether of tubular or other construction, shall:
   (A) Ensure a one-foot overlap of all adjoining sections so the water level is visible; or
   (B) Ported or reflex gages using refractive light to aid determination of water level may omit the requirement of overlapping sections;

(9) The gage glass cock connections shall not be less than one-half (1/2) of an inch NPS;

(10) Each gage glass, externally mounted water level, or water level controlling device shall be fitted with a drain cock or valve having an unrestricted drain opening of not less than one-fourth (1/4) of an inch in diameter to facilitate cleaning;

(11) No outlet connections, except for damper regulators, feedwater regulators, drains, steam gages, or apparatus of a form that does not permit the escape of an appreciable amount of steam or water therefrom, shall be placed in the pipes connecting a water column or gage glass to a boiler;

(12) The water column shall be fitted with a drain cock or drain valve of at least three-fourths (3/4) of an inch nominal pipe size and shall be piped to a safe point of discharge;

(13) Connections from the boiler to the water column shall be at least NPS 1;

(14) Connections for gage glasses connected directly to the boiler or to an intervening water column shall be at least NPS one-half (1/2);

(15) Connections from the boiler to a remote water level indicator shall be at least NPS three-fourths (3/4), including the isolation valve; and from there to the remote level indicator at least one-half (1/2) of an inch in OD tubing;

(16) Water level connections shall be completely independent of other connections for any function other than water level indication;

(17) The steam and water connections to a water column or a water gage glass shall be readily accessible for internal inspection and cleaning; and

(18) Shutoff valves shall not be used in the pipe connections between a boiler and a water column, or between a boiler and the shutoff valves required for the gage glass, except:

(A) Outside screw-and-yoke or lever-lifting-type gate valves or stopcocks with lever permanently fastened thereto and marked in line with their passage; and

(B) Another through-flow construction that prevents stoppage by deposits of sediment, and to indicate by the position of the operating mechanisms whether they are in open or closed position. These valves or cocks shall be locked or sealed open. Where stopcocks are used, they shall be of a type with the plug held in place by a guard or gland.

(b) Low-water fuel cutoffs and water feeding devices. The following shall apply to low-water fuel cutoffs and water feeding devices:

(1) Each automatically fired, high pressure steam boiler, except miniature boilers, shall have at least two automatic low water fuel cut-off devices. When installed external to the boiler, each device shall be installed in individual chambers (water

columns), which shall be attached to the boiler by separate pipe connections below the waterline. A common steam connection is permissible. Each cut-off device shall be installed to prevent startup and cut off 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 gage glass. One control shall be set to function ahead of the other;

(2) Functioning of the lower of the two controls shall cause safety shutdown and lockout. The manual reset may be incorporated in the lower cut-off control. Where a reset device is separate from the low-water fuel cutoff, a means shall be provided to indicate actuation of the low water fuel cutoff. The manual reset device may be of the instantaneous type or may include a time delay of not more than three (3) minutes after the fuel has been cut off;

(3) The fuel cut-off device may be inserted internally or attached externally to the boiler. An external cut-off device may be attached on piping connecting a water column to the boiler or combined with a water column;

(4) Water column piping and connections shall be at least NPS 1 (DN 25). If the low-water fuel cutoff is connected to the boiler by pipe or fittings, no shutoff valves of any type shall be placed in such piping. The steam and water connections to a water column shall be readily accessible for internal inspection and cleaning. Some acceptable methods of meeting this requirement are by providing a cross-fitting with a back outlet at each right-angle tum to permit inspection and cleaning

in both directions or by using pipe bends or fittings of a type that does not leave an internal shoulder or pocket in the pipe connection and with a radius of curvature that will permit the passage of a rotary cleaner. Fuel cut-off devices embodying a separate chamber shall have a vertical drainpipe and blowoff valve, not less than NPS 3/4, located at the lowest point of the chamber or water-equalizing pipe connections, so that the chamber and the equalizing pipe can be flushed and the device tested;

(5) Each miniature boiler, except electric boilers of the electrode type, shall have at least one low water fuel cut-off device;

(6) These devices shall be installed in such a manner that they cannot be rendered inoperative by the manipulation of any manual control or regulating apparatus;

(7) In boilers with a fixed water line, the low-water fuel cutoff devices shall be tested regularly by lowering the water level sufficiently to shut off the fuel supply to the burner when the water level reaches the lowest safe level for operation. Boilers that do not have a fixed water line shall be equipped with a flow sensing device, thermal couple or expansion ring that is listed by a nationally recognized testing agency to prevent burner operation at a flow rate inadequate to protect the boiler unit against overheating;

(8) Boilers with single drain electronic solenoid valve shall be fitted with a manual by-pass drain line to facilitate testing of the low water cutoff safety device;

(9) The low-water cutoff shall be rated for a pressure and temperature equal to or

greater than the MAWP and temperature of the boiler;

(10) For high-temperature water boilers requiring forced flow circulation, an approved flow sensing device shall be installed on the outlet, as close to the boiler as possible;

(11) When a low-water fuel cutoff and feedwater pump control is combined in a single device, an additional separate low-water fuel cutoff shall be installed. The additional control shall be wired in series electrically with the existing low-water fuel cutoff;

(12) When a low-water fuel cutoff is housed in either the water column or a separate chamber it shall be provided with a blowdown pipe and valve not less than 3/4 inch NPS. The arrangement shall be such that when the water column is blown down, the water level in it will be lowered sufficiently to activate the lower-water fuel cutoff device; and

(13) If a water feed device is utilized, it shall be constructed to prevent feedwater from entering the boiler through the water column or separate chamber of the low-water fuel cutoff. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-8 Boiler external and non-boiler external piping. Boiler external piping (BEP).

(1) BEP shall be designed, fabricated, installed and stamped in accordance with ASME BPVC Section I and ASME B31.1;

(2) Manufacturers of BEP shall possess an ASME certificate of authorization to use the certification mark with the "S" or "PP" designator;

(3) BEP may be installed by a manufacturer or contractor other than the manufacturer of the boiler, provided the organization has been issued a certificate of authorization to use the certification mark with the "S", "PP" or "A" designator; and in possession of a current and valid Hawaii contractors license as required in section 12-220-15;

(4) Prior to starting BEP installation, an application for installation shall be submitted to the department for an installation permit; and

(5) Welded repairs or alterations to boiler external piping shall be done by a company in possession of a valid NB "R" certificate of authorization.

(b) Non-boiler external piping (NBEP).

(1) NBEP design, fabrication, installation, alteration, or repair shall be done in accordance with the applicable provisions of the ASME BPVC, ASME B31.1, NBIC and this part;

(2) NBEP may be designed, fabricated, installed, altered, or repaired by organizations with valid ASME "S", "PP", or "A" designators or a NB "R" certificate of authorization, or organizations with a valid Hawaii NBEP certificate of authorization;

(3) Applicants whose quality control program have been reviewed, approved, and issued an NBEP certificate of authorization by the department shall be qualified to design, fabricate, install, alter, or repair NBEP within the provisions of ASME B31.1 and NBIC Part 3; and

(4) Application for authorization for design, fabrication, installation, alteration, or repair shall be submitted to the department as prescribed in section 12-220-9.1. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-9 Electric and miniature boilers. (a) In accordance with ASME BPVC Section 1, new miniature boilers shall be constructed, inspected, and bear the ASME certification mark with the "S", "M", or "E" designator. The controls and safety devices shall be installed in accordance with ASME CSD-1. New miniature boiler installations shall comply with section 12-222.1-5.

(b) Miniature boilers used in generating steam for autoclave sterilizers shall be registered separately from the autoclave. The autoclave shall be registered as a pressure vessel if size and pressure is within limits unless exempted by section 12-220-2.1(c).

(c) The maximum allowed working pressure is 100 psi in accordance with the ASME BPVC section 1.

(d) Each miniature boiler shall be equipped with a sealed spring-loaded pop safety valve of not less than one-half (1/2) inch NPS.

(e) Each steam line from a miniature boiler shall be provided with a steam rated stop valve located as close to the boiler shell or drum as is practicable, except when the boiler and steam receiver is operated as a closed system.

(f) Miniature boilers for operation with a definite water level shall be equipped with a glass water gage for determining the water level. The lowest permissible water level for vertical boilers shall be at a point one-third (1/3) of the height of the shell above the bottom head or tube sheet. The following shall apply:

(1) Tubular gage glasses on electric boilers shall be equipped with protective rods or shields; and

(2) Each gage glass shall be fitted with a drain cock and valve having an unrestricted drain opening of not less than one-fourth (1/4) inch diameter to facilitate water flush draining of the gage glass.

(g) Where the boiler is equipped with an internal furnace, the water level shall not be less than one-third (1/3) of the length of the tubes above the top of the furnace tube sheet.

(h) In the case of small boilers operated in a closed system where there is insufficient space for the usual glass water gage, water level indicators of the glass bull's eye type may be used.

(i) Miniature boilers shall be provided with at least one feed pump or other feeding device, except where it is connected to a water main carrying sufficient pressure to feed the boiler or where it is operated with no extraction of steam (closed system). In the latter case, in lieu of a feeding device, a suitable connection or opening shall be provided to fill the boiler when cold. Such connection shall be no less than one-half (1/2) inch NPS for iron or steel pipe and one-fourth (1/4) inch NPS for brass or copper pipe.

(j) The feed pipe shall be provided with a check valve and a stop valve of a size not less than that of the pipe. The feedwater may be delivered through the blowoff opening if desired.

(k) Miniature boilers shall be equipped with a blowoff connection, not less than one-half (1/2) inch NPS, located to drain from the lowest water space practicable. The blowoff piping shall be equipped with a stop valve not less than one-half (1/2) inch NPS.

(l) Miniature boilers solely equipped with an automatic/timed blowoff valve shall be equipped with a manual bypass loop which bypasses automatic valve to facilitate testing of the low water cutoff controls.

(m) Miniature boilers exceeding twelve (12) inches internal diameter or having more than ten (10) square feet of heating surface shall be fitted with not less than three (3) brass washout plugs of one-inch NPS which shall be screwed into openings in the shell near the bottom. In miniature boilers of the closed type system heated by removable internal electric heating elements, the openings for these elements, when suitable for cleaning purposes, may be substituted for washout openings.

(n) Boilers not exceeding twelve (12) inches internal diameter and having less than ten (10) square feet of heating surface need not have more than two (2) one-inch openings for clean-outs, one of which may be

used for the attachment of the blow-off valve. These openings shall be opposite to each other where possible. The following shall apply:

(1) All threaded openings shall be opposite to each other where possible; and

(2) All threaded openings in the boiler shall be provided with a riveted or welded reinforcement to give four (4) full threads therein.

(o) Electric boilers of a design employing a removable top cover flange for inspection and cleaning need not be fitted with washout openings.

(p) All valves, pipe fittings, and appliances connected to a miniature boiler shall be equal to at least the requirements of Class 125 or Class 150 of the appropriate ASME Standard as listed in ASME BPVC Section I.

(q) All welded repairs and alterations to miniature boilers must comply with the rules in this part as defined in NBIC Part 3. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-10 Attendance. (a) An unattended power boiler log (Exhibit 4) shall be maintained by owners or operators at the boiler operating area to record daily checks and inspections and the following shall apply:

(1) Boiler operation log entries shall be updated; daily, not to exceed twelve (12) hours for a single entry; and

(2) The daily operating log shall be available to the inspector of record for a period of not less than six (6) months.

(b) Power boilers, waste heat boilers, and high-temperature water boilers subject to this chapter shall not be left in operation unattended by a competent attendant for a period of time longer than it will take the water level to drop from a normal operating level to the lowest permissible water level, as indicated by the water gage glass, or by indicating devices or recorders,

when the feed water is shut off and the boiler is forced to its maximum capacity, unless all of the following are complied with where applicable:

(1) The boiler is equipped with a strobe or flashing light that will operate when the water reaches the lowest permissible operating level, or, for boilers having no fixed steam or water line, when the highest permissible operating temperature is reached. The strobe or flashing light shall be so located that can be plainly seen at the most remote point from the boiler at which the attendant is required to work. Audible alarms, when used, shall be distinctly audible above the ambient noise level;

(2) The boiler is equipped with two low water safety devices with separate water connections to the boiler that will shut off the fuel to the burner or burners when the water reaches the lowest permissible operating level, or, for boilers having no fixed steam or water line, when the highest permissible operating temperature is reached. These devices shall require manual resetting unless the burner is equipped with a full safety pilot control;

(3) A competent attendant personally checks the operation of the boiler, the necessary auxiliaries, and the water level of the boiler at such intervals, not exceeding sixty (60) minutes, as necessary to insure the safe operation of the boiler. The operation of the automatic water level controls shall be tested such that fuel to the burner will be shut off at the beginning of each daily period of operation and at intervals not to exceed twelve (12) operating hours. A record of each inspection and check of controls shall be maintained and available to an inspector for a period of six (6) months prior to the inspection;

(4) There is a conspicuous and readily accessible safety disconnect switch located adjacent to

the boiler room entrance or, in the situation where the boiler is located outside, in the immediate vicinity of the boiler which, when operated, will cut off all power to the boiler and cause it to shut down in a safe manner. Immediately adjacent to the disconnect device there shall be posted a sign conspicuously directing the observer to use the device for shutting down the boiler in event of emergency, such as observing any unsafe condition or functioning of the boiler or its appurtenances or any condition or function of the boiler which is unusual, or which is, in the observer's opinion, potentially hazardous;

(5) A competent attendant means a person who is familiar with the operation of the boiler and may be certified by a curriculum accredited college, university, technical school, or organization serving the boiler industry;

(6) The minimum standards to be met for an attendant to be competent include, but are not limited to the following, as detailed in the ASME BPVC Section VII:

(A) The ability to explain the function and operation of all controls and safety devices on the boiler and operate the boiler in a safe manner;

(B) The knowledge of all possible methods of feeding water to the boiler; and boiler blowoff/blowdown procedure; and

(C) Shutting down the boiler or boilers in a safe manner; and

(7) The attendant performs a recommended operation checklist schedule recorded at each regular shift not to exceed twelve (12) hours, and checks and records the following:

(A) Externally examine unit for leaks or unusual conditions;

(B) Check burner flame;

(C) Check gages, monitors, and indicators;

(D) Low water cutoff and alarm test; and

(E) Water column and gage glass blowdown.

[Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-11 Boiler room and operating area. (a) The following shall apply to the care of the boiler room:

(1) The boiler room shall be free from accumulation of rubbish and materials that obstruct access to the boiler, its setting, or firing equipment;

(2) The storage of flammable material or gasoline powered equipment in the boiler room is prohibited;

(3) The roof over boilers designed for indoor installations, shall be free from leaks and maintained in good condition;

(4) Adequate drainage shall be provided;

(5) All exit doors shall open outward; and

(6) It is recommended that the ASME BPVC Section VII be used as a guide for proper and safe operating practices.

(b) The following shall apply to boiler supports, foundations, and settings:

(1) Each boiler and its associated piping shall be safely supported. Design of supports, foundations, and settings shall consider vibration, including seismic where necessary, movement including thermal expansion and contraction, and loadings including the weight of the fluid in the system during a pressure test in accordance with jurisdictional requirements, manufacturers recommendations, and other industry standards as applicable; and

(2) If the boiler is supported by structural steel, the steel supporting members shall be so located or insulated that the heat from the furnace will not affect their strength. Structural steel shall be installed in accordance with jurisdictional requirements,

manufacturer's recommendations, and other industry standards, as applicable.

(c) Exit. Two means of exit shall be provided for equipment rooms exceeding 500 square feet of floor area and containing one or more boilers having a combined fuel capacity of 1,000,000 Btu/hr or more (or equivalent electrical heat input). Each elevation shall be provided with at least two means of exit, each to be remotely located from each other. A platform at the top of a single boiler is not considered an elevation.

(d) Ladders and runways. The following shall apply to ladders and runways:

(1) All walkways, runways, and platforms shall be of metal construction or equivalent material;

(2) Provided between or over the top of boilers that are more than eight (8) feet above the operating floor to afford accessibility for normal operation, maintenance, and inspection;

(3) Constructed of safety treads, standard grating, or similar material and have a minimum width of thirty (30) inches; of bolted, welded, or riveted construction; and equipped with handrails forty-two (42) inches high with an intermediate rail and four (4) inch toe-board;

(4) Stairways that serve as a means of access to walkways, runways, or platforms shall not exceed an angle of forty-five (45) degrees from the horizontal and shall be equipped with handrails forty-two (42) inches high with an intermediate rail;

(5) Ladders that serve as a means of access to walkways, runways, or platforms shall:

(A) Be made of metal construction and not less than eighteen (18) inches wide;

(B) Have rungs that extend through the side members and are permanently secured;

(C) Have a clearance of not less than thirty (30) inches from the front of rungs to the nearest permanent object on the climbing side of the ladder;

(D) Have a clearance of not less than six and a half (6-1/2) inches from the back of rungs to the nearest permanent object; and

(E) Have a clearance width of at least fifteen (15) inches from the center of the ladder on either side across the front of the ladder; and

(6) There shall be at least two permanently installed means of exit from walkways, runways, or platforms that exceed six (6) feet in length.

(e) Fuel. Fuel systems, whether firing coal, oil, gas, or other substance, shall be installed in accordance with departmental, environmental requirements, manufacturer's recommendations, and industry standards, as applicable.

(f) Ventilation and combustion air. The following shall apply to ventilation and combustion air:

(1) The equipment room shall have an adequate air to permit clean, safe combustion, minimize soot formation, and maintain a minimum of nineteen and a half per cent (19.5%) oxygen in the air of the equipment room and sufficient to maintain ambient temperatures as recommended by the boiler manufacturer. The combustion and ventilation air should be supplied by either an unobstructed air opening or by power ventilation or fans. When combustion air is supplied to the boiler by an independent duct, with or without the employment of power ventilators or fans, the duct shall be sized and installed in accordance with the manufacturer's recommendations;

(2) When combustion air is supplied to the boiler, heater, or vessel by an independent duct, with or without the employment of power ventilators or fans, the duct shall be sized and installed in accordance with the manufacturer's recommendations;

(3) Unobstructed air openings shall be sized based on the manufacturer's recommendations, or as specified by the National Fire Protection Association (NFPA) standards for oil and gas burning installations for the particular job conditions, or 1 square inch free area per 2000 Btu/hr maximum fuel input of the combined burners located in the equipment room. The equipment room supply openings shall be kept clear at all times;

(4) Power ventilators or fans shall be sized on the basis of 0.2 cfm for each 1000 Btu/hr of maximum fuel input for the combined burners of all boilers and heaters located in the equipment room. Additional capacity may be required for other fuel burning equipment in the equipment room;

(5) When power ventilators or fans are used to supply combustion air, they shall be installed with interlock devices so that burners will not operate without an adequate number of ventilators or fans in operation;

(6) The size of openings specified in subsection (c) may be reduced when special engineered air supply systems approved by the jurisdiction are used; and

(7) Care shall be taken to ensure that steam, water, and fluid lines are not routed across combustion air openings, where freezing may occur.

(g) Lighting. The equipment room shall be well lit and have an emergency light source for use in case of power failure.

(h) Chimneys or stacks shall be installed in accordance with jurisdictional, environmental requirements, manufacturer's recommendations, and industry standards, as applicable.

(i) Ash removal systems shall be installed in accordance with jurisdictional, environmental requirements, manufacturer's recommendations, and industry standards, as applicable.

(j) Water (cleaning). A convenient water supply shall be provided for flushing out the boiler and its appurtenances, adding water to the boiler while it is not under pressure, and cleaning the equipment room floor. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-12 Operating requirements. (a) Feedwater volume. The source of feedwater shall be capable of supplying a sufficient volume of water as determined by the boiler manufacturer to prevent damage to the boiler when all the safety relief valves are discharging at full capacity.

(b) Feedwater connection. The following shall apply to feedwater connection:

(1) To prevent thermal shock, feedwater shall be introduced into a boiler in such a manner that the water will not be discharged directly against surfaces exposed to high temperature gases or to direct radiation from the flame;

(2) For boiler operating pressures of 400 psig or higher, the feedwater inlet through the drum shall be fitted with shields, sleeves, or other suitable means to reduce the effects of temperature differentials in the shell or head;

(3) Feedwater other than condensate return shall not be introduced through the blowoff;

(4) Boilers having more than 500 square feet of water heating surface shall have at least two means of supplying feedwater. For boilers that are fired with solid fuel not in suspension, and boilers whose setting or heat source can continue to supply sufficient heat to cause damage to the boiler if the feedwater supply is interrupted, one such means of supplying feedwater shall not be subject to the same interruption as the first method. Boilers fired by gaseous, liquid, or

solid fuel in suspension may be equipped with a single means of supplying feedwater, provided means are furnished for the immediate removal of heat input if the supply of feedwater is interrupted;

(5) For boilers having a water heating surface of not more than 100 square feet, the feedwater piping and connection to the boiler shall not be smaller than NPS 1/2. For boilers having a water heating surface more than 100 square feet, the feedwater piping and connection to the boiler shall not be less than NPS 3/4;

(6) Electric boiler feedwater connections shall not be smaller than NPS 1/2; and

(7) High-temperature water boilers shall be provided with means of adding water to the boiler or system while under pressure.

(c) Pumps. The following shall apply to pumps:

(1) Boiler feedwater pumps shall have discharge pressure more than the highest set pressure relief valve to compensate for frictional losses, entrance losses, regulating valve losses, and normal static head, etc. Each source of feedwater shall be capable of supplying feedwater to the boiler at a minimum pressure of three per cent (3%) higher than the highest setting of any pressure relief valve on the boiler proper. Detailed engineering evaluation of the pump selection shall be performed and available for review. Table 2.5.1.3 is a guideline for estimating feedwater pump differential;

TABLE 2.5.1.3

GUIDE FOR FEEDWATER PUMP DIFFERENTIAL

Boiler Pressure		Boiler Feedwater Pump Discharge Pressure	
psig	(MPa)	psig	(MPa)
200	(1.38)	250	(1.72)
400	(2.76)	475	(3.28)
800	(5.52)	925	(6.38)
1,200	(8.27)	1,350	(9.31)

(2) For forced-flow steam generators with no fixed steam or water line, each source of feedwater shall be capable of supplying feedwater to the boiler at a minimum pressure equal to the expected maximum sustained pressure at the boiler inlet corresponding to operation at maximum designed steaming capacity with maximum allowable pressure at the superheater outlet; and

(3) Control devices may be installed on feedwater piping to protect the pump against overpressure.

(d) Feedwater valves. The following shall apply to feedwater valves:

(1) The feedwater piping shall be provided with a check valve and a stop valve. The stop valve shall be located between the check valve and the boiler;

(2) When two or more boilers are fed from a common source, there shall also be a globe or regulating valve on the branch to each boiler located between the check valve and the feedwater source;

(3) When the feedwater piping is divided into branch connections and all such connections are equipped with stop and check valves, the stop and check valve in the common source may be omitted;

(4) On single boiler-turbine unit installations, the boiler feedwater stop valve may be located upstream from the boiler feedwater check valve;

(5) If a boiler is equipped with duplicate feedwater supply arrangements, each such

arrangement shall be equipped as required by these rules;

(6) A check valve shall not be a substitute for a stop valve;

(7) A combination feedwater stop-and-check valve in which there is only one seat and disk and a valve stem is provided to close the valve when the stem is screwed down shall be considered only as a stop valve; a separate check valve shall also be installed;

(8) Whenever globe valves are used on feedwater piping, the inlet shall be under the disk of the valve;

(9) Stop valves and check valves shall be placed on the inlet of economizers or feedwater-heating devices; and

(10) The recirculating return line for a high-temperature water boiler shall be provided with the stop valve, or valves, required for the main discharge outlet on the boiler.

(e) Electrical. A disconnecting means capable of being locked in the open position shall be installed at an accessible location at the boiler so that the boiler can be disconnected from all sources of potential. This disconnecting means shall be an integral part of the boiler or adjacent to it.

(f) Wiring. All wiring for controls, heat generating apparatus, and other appurtenances necessary for the operation of the boiler or boilers should be installed in accordance with the provisions of national or international standards and comply with the applicable local electrical codes.

(g) Remote emergency shutdown switches. The following shall apply to remote emergency shutdown switches:

(1) A manually operated remote shutdown switch or circuit breaker shall be located just outside the equipment room door and marked for easy identification. Consideration should also be given to the type and location of the switch to safeguard against tampering. Where approved by the jurisdiction, alternate

locations of remote emergency switches may be provided;

(2) For equipment rooms exceeding 500 square feet floor area, or containing one or more boilers having a combined fuel capacity of 1,000,000 Btu/hr or more, additional manually operated remote emergency shutdown switches shall be located at suitably identified points of egress acceptable to the jurisdiction;

(3) Where a boiler is located indoors in a facility and not in an equipment room, a remote emergency shutdown switch shall be located within fifty (50) feet of the boiler along the primary egress route from the boiler area;

(4) For atmospheric-gas burners and for oil burners where a fan is on the common shaft with the oil pump, the emergency remote shutdown switches or circuit breakers must disconnect all power to the burner controls; and

(5) For power burners with detached auxiliaries, the emergency remote shutdown switches or circuit breakers need only shut off the fuel input to the burner. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-13 Controls and heat-generating apparatus. (a) Oil and gas-fired and electrically heated boilers shall be equipped with suitable primary (flame safe-guard) safety controls, safety limit switches and controls, and burners or electric elements as required by a nationally or internationally recognized standard.

(b) The symbol of the certifying organization that has approved such equipment as having complied with a nationally recognized standard shall be affixed to the equipment and shall be considered as evidence

that the unit was manufactured in accordance with that standard.

(c) These devices shall be installed in accordance with departmental, environmental requirements, manufacturer's recommendations, and industry standards, as applicable. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-14 Emergency valves and controls. All emergency shut-off valves and controls shall be accessible from a floor, platform, walkway, or runway. Accessibility shall mean within a six (6) foot elevation of the standing space and not more than twelve (12) inches horizontally from the standing space edge. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-222.1-15 Preventive maintenance. The owner or user of the pressure retaining item is responsible for ensuring that all equipment is maintained as listed in Exhibits 1, 2 and 4 of this section." [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

RECOMMENDED PREVENTIVE MAINTENANCE SCHEDULE

(Operation and maintenance instructions in this safety standard are intended for general applications. For specific operating and maintenance instructions, consult the equipment manufacturer.)

D-1 DAILY

(a) Check gages, monitors, and indicators.
(b) Check instrument and equipment settings.
(c) For high-pressure boilers, test low-water fuel cut-off device and alarm.
(d) Check burner flame.

D-2 WEEKLY

(a) For low-pressure boilers, test low-water fuel cut-off device and alarm.
(b) Check igniter.
(c) Check flame signal strength.
(d) Check flame failure detection system.
(e) Check firing rate control.
(f) Make aural and visual check of pilot and main fuel valves.

D-3 MONTHLY

(a) Check flue, vent, stack, or outlet dampers.
(b) Test low draft, fan air pressure, and damper position interlocks.
(c) Check low-fire start interlock.
(d) Test high and low oil pressure and temperature interlocks.
(e) Test high and low gas pressure interlocks.

D-4 SEMI-ANNUALLY

(a) Recalibrate all indicating and recording gages.
(b) For steam boilers, perform a slow drain test of the low-water fuel cut-off device.
(c) Check flame failure detection system components.
(d) Check firing rate control.
(e) Check piping and wiring of all interlocks and shut-off valves.
(f) Inspect burner components.

D-5 ANNUALLY

(a) Flame failure detection system, pilot turndown test.
(b) Flame failure detection system, test for hot refractory hold in.
(c) Check dual fuel change over control.
(d) Test high-limit and operating temperature or steam pressure controls.
(e) Replace vacuum tubes, scanners, or flame rods in accordance with manufacturer's instructions.
(f) Conduct a combustion test.
(g) Check all coils and diaphragms; test other operating parts of all safety shutoff and control valves.
(h) Test fuel valve interlock switch in accordance with manufacturer's instructions.
(i) Perform leakage test on pilot and main gas and/or oil fuel valves.
(j) Test purge air switch in accordance with manufacturer's instructions.
(k) Test air/steam interlock in accordance with manufacturer's instructions.
(l) Test burner position interlock in accordance with manufacturer's instructions.
(m) Test rotary cup interlock in accordance with manufacturer's instructions.
(n) Test low-fire start interlock in accordance with manufacturer's instructions.

D-6 AS REQUIRED

(a) Recondition or replace low-water fuel cut-off device.
(b) For oil-fired burners, clean atomizers and oil strainers.
(c) For gas-fired burners, check sediment trap and gas strainers.
(d) Flame failure detection system, pilot turndown test.
(e) Flame failure detection system, test for hot refractory hold in.
(f) Test safety/safety relief valves in accordance with ASME Boiler and Pressure Vessel Code, Sections VI and VII.

Table D-1 Periodic Testing Recommended Checklist (See Manufacturer's Instructions)

Frequency [Note (1)]								Accomplished By	
D	W	M	S/A	A	A/R	Component/Item	Recommended Test	Boiler Operator	Service Technician
X	...	...	...	...	...	Gages, monitors, and indicators	Make visual inspection and record readings in boiler log.	X	...
...	...	...	X	...	...	Gages, monitors, and indicators	Recalibrate all indicating and recording gages.	...	X
X	...	...	...	...	...	Instrument and equipment settings	Make visual check against factory-recommended specifications.	X	...
X	...	...	...	...	...	Low-water fuel cut-off device (high-pressure boilers)	Test low-water fuel cut-off device according to manufacturer's instructions.	X	...
...	X	...	...	...	...	Low-water fuel cut-off device (low-pressure boilers)	Test low-water fuel cut-off device according to manufacturer's instructions.	X	...
...	...	...	X	...	...	Low-water fuel cut-off device (steam boilers)	For steam boilers, perform a slow drain test in accordance with ASME Boiler and Pressure Vessel Code, Section VI.	...	X
...	...	...	...	...	X	Low-water fuel cut-off device	Recondition or replace low-water fuel cut-off device.	...	X
...	...	...	...	X	...	Operating and/or limit controls	Test high-limit and operating temperature or steam pressure controls.	...	X
...	...	...	...	...	X	Safety/safety relief valves	Test safety/safety relief valves in accordance with ASME Boiler and Pressure Vessel Code, Sections VI and VII.	...	X
...	...	X	...	...	...	Flue, vent, stack, or outlet dampers	Make visual inspection of linkage, and check for proper operation.	X	...
X	...	...	...	...	...	Burner flame	Make visual inspection of burner flame [Note (2)].	X	...
...	X	...	...	...	...	Igniter	Make visual inspection, and check flame signal strength if meter-fitted.	X	...
...	X	...	...	...	...	Flame signal strength	If flame signal meter is installed, read and log. For both pilot and main flames, notify service organization if readings are very high, very low, or fluctuating (refer to manufacturer's instructions).	X	...
...	X	...	...	...	...	Flame failure detection system	Close manual fuel supply for (1) pilot, (2) main fuel cock, and/or (3) valve(s). Check safety shutdown timing, and log.	X	...

Table D-1 Periodic Testing Recommended Checklist (Cont'd)

Frequency [Note (1)]								Accomplished By	
D	W	M	S/A	A	A/R	Component/Item	Recommended Test	Boiler Operator	Service Technician
...	...	...	X	...	...	Flame failure detection system	Check flame failure detection system components, such as vacuum tubes, amplifier, and relays.	...	X
...	...	...	...	X	...	Flame failure detection system	Replace vacuum tubes, scanners, or flame rods in accordance with manufacturer's instructions.	...	X
...	...	...	...	X	X	Flame failure detection system (pilot turndown test)	Conduct pilot turndown test according to manufacturer's instructions. This test is required annually and after any adjustments to flame scanner mount or pilot burner.	...	X
...	...	...	...	X	X	Flame failure detection system (hot refractory hold in test)	Test for hot refractory hold in. This test is required annually and after any adjustments to the flame scanner mount or pilot burner.	...	X
...	X	...	...	...	...	Firing rate control	Check firing rate control, and verify factory settings (refer to manufacturer's instructions).	X	...
...	...	...	X	...	...	Firing rate control	Check firing rate control, and verify factory settings (refer to manufacturer's instructions).	...	X
...	...	...	...	X	...	Firing rate control	Conduct a combustion test, and verify settings are in accordance with manufacturer's instructions.	...	X
...	X	...	...	...	...	Pilot and/or main fuel valves	Open limit switch, and make aural and visual check. Check valve position indicators, and check fuel meters if so fitted.	X	...
...	...	...	...	X	...	Pilot and/or main fuel valves	Check all coils and diaphragms. Test other operating parts of all safety shutoff and control valves.	...	X
...	...	...	...	X	...	Pilot and/or main fuel valves	Test fuel valve interlock switch in accordance with manufacturer's instructions.	...	X
...	...	...	...	X	...	Pilot and/or main fuel valves	Perform leakage test on pilot and main gas and/or oil fuel valves, in accordance with manufacturer's instructions.	...	X
...	...	X	...	...	...	Low draft, fan, air pressure, and damper position interlocks	Test low draft, fan, air pressure, and damper position interlocks according to manufacturer's instructions.	X	...
...	...	...	...	X	...	Low draft, fan, air pressure, and damper position interlocks	Test purge switch in accordance with manufacturer's instructions.	...	X

EXHIBIT 2 Continued

Table D-1 Periodic Testing Recommended Checklist (Cont'd)

Frequency [Note (1)]								Accomplished By	
D	W	M	S/A	A	A/R	Component/Item	Recommended Test	Boiler Operator	Service Technician
...	...	X	...	...	...	Low-fire start interlock	Check low-fire start interlock according to manufacturer's instructions.	X	...
...	...	...	...	X	...	Low-fire start interlock	Test low-fire start interlock in accordance with manufacturer's instructions.	...	X
...	...	X	...	...	...	Oil pressure and temperature interlocks	Test high and low oil pressure and temperature interlocks according to manufacturer's instructions.	X	...
...	...	X	...	...	...	Gas pressure interlocks	Test high and low gas pressure interlocks according to manufacturer's instructions.	X	...
...	...	...	X	...	...	Interlocks and valves	Check piping and wiring of all interlocks, and shutoff valves.	...	X
...	...	...	...	X	...	Atomizing air/steam interlock	Test air/steam interlock in accordance with manufacturer's instructions.	...	X
...	...	...	...	X	...	Burner position interlock	Test burner position interlock in accordance with manufacturer's instructions.	...	X
...	...	...	...	X	...	Rotary cup burner interlock	Test rotary cup interlock in accordance with manufacturer's instructions.	...	X
...	...	...	X	...	...	Burner components	Inspect burner components according to manufacturer's instructions.	...	X
...	...	...	...	X	X	Burner components	Check dual fuel change over control. If automatically controlled by gas utility, perform test under the supervision of gas utility.	...	X
...	...	...	...	...	X	Burner components	For oil-fired burners, clean atomizers and oil strainers.	...	X
...	...	...	...	...	X	Burner components	For gas-fired burners, check sediment trap and gas strainer.	...	X

NOTES:
(1) D, daily; W, weekly; M, monthly; S/A, semi-annually; A, annually; A/R, as-required.
(2) Caution should be used when viewing burner flame. Personal protective equipment, such as filtered eyeware, may be necessary.

BOILER INSTALLATION REPORT I-1

INSTALLATION: (1) ☐New ☐Reinstalled ☐Second Hand Date ___/___/___

(2) INSTALLER	(3) OWNER-USER	(4) OBJECT LOCATION
Name	Name	Name
Street	Street, PO Box, RR	Street
City, State, ZIP	City, State, ZIP	City, State, ZIP

Jurisdiction No. (5)	National Board No. (6)	Manufacturer (7)	Mfg. Serial No. (8)	Year Built (9)	Boiler Type (10)	Boiler Use (11)
Fuel (12)	Method of Firing (13)	Btu/kw input (14)	Btu/kw output (15)	Operating PSI (16)	Code Stamp(s) (17)	☐A ☐S ☐U ☐HLW ☐M ☐E ☐H ☐Other
Stamped MAWP (18)	Heating Surface, Sq. Ft. (19)	Cast Iron (20)	Manhole (21)	Specific On-Site Location, i.e., Utility Room (22)		

Pressure Relief Valve Size (23)	Pressure Relief Valve Set Pressure (24)	Pressure Relief Valve Capacity ☐BTU/hr ☐Lb/hr (25)	Manufacturer (26)	Low-Water Fuel Cutoff Mfg. (27) No.
1.	1.	1.	1.	Probe Type
2.	2.	2.	2.	Flow Switch
3.	3.	3.	3.	Float & Chamber
4.	4.	4.	4.	Other (Specify)

PRESSURE/ALTITUDE GAGE: (28)	EXPANSION TANK: (29)	VENTILATION AND COMBUSTION AIR (30)
Dial Graduation	ASME Constructed ☐Yes ☐No	
Valve/Cock Size MAWP	Other	Unobstructed Opening (sq. in.)
Pipe Connection Size	MAWP	Power Ventilator Fan (CFM)
Siphon or Equivalent Device ☐Yes ☐No	No. Gallons	

WATER LEVEL INDICATORS: (31)	FEEDWATER SUPPLY: (32)
Numer of Gage Glasses	Number of Feeding Means
Number of Remote Indicators	Pipe Size
Size of Connection Piping	Stop Valve Size MAWP
	Check Valve Size MAWP

STOP VALVES: (33)	EXTERNAL PIPING ASME CODE: (40)	FUEL TRAIN:
Number of Valves	☐Yes ☐No	☐CSD-1 ☐NFPA-85
Valve Size	☐Other	☐Other

BOTTOM BLOWDOWN CONNECTIONS: (39)	POTABLE WATER HEATER UNIQUE REQUIREMENTS ☐Yes ☐No
Number of Valves	Inlet Stop Valve Size MAWP
Valve Size MAWP	Outlet Stop Valve Size MAWP
Piping Run Full Size ☐Yes ☐No	Drain Valve Size (34)
	Thermometer ☐Yes

Manufacturer's Certification Attached: ☐Yes ☐No (35)	Clearance from walls and floors: (36)
Does boiler replace existing one: ☐Yes ☐No (36)	Side Bottom Top

Additional recommendations and remarks by installer: (37)

(38) Installer Name (PRINT)	Registration #	I HEREBY CERTIFY THAT THE INSTALLATION COMPLIES WITH APPENDIX I (38) Installer Signature

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Ave., Columbus, OH 43229 NB-365 Rev. 2

8.1 Unattended Power Boiler Log

UNATTENDED POWER BOILER LOG

aw. No. _____ Year _____ Month _____ Company _____

Day	5am	6am	7am	8am	9am	10am	11am	Noon	1pm	2pm	3pm	4pm	5pm	Remarks (including date & time)
Ex-ample		1 3	√5	√	√	√	√	√	√	√2	√	√	√5 4	
1														
2														
3														
4														
5														
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31														

CODE

√ Normal Operating Check (boiler in service)
1 Started Boiler & Tested Low Water Control
2 Tested LWC (required every 12 hours when the boiler is in service) Test with the Burner On, Test Must Extinguish Burner and Ring Low Water Alarm
3 Added Chemicals
4 Blow-down
5 Tested Safety Valve (first working day of the month hand raise spindle)
6 Stopped Boiler

NOTE: The completed log must be available to the boiler inspector for at least six (6) months.

"

6. Chapter 12-223, Hawaii Administrative Rules, entitled "Heating Boilers", is repealed:

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILER AND PRESSURE VESSELS

CHAPTER 223

HEATING BOILERS

Historical Note: Chapter 223 of title 12 is based on chapter 377 of the Hawaii Occupational Safety and Health Standards, Rules and Regulations. Eff 7/11/74; am 12/30/76; am 8/1/78; R 12/6/82]

[**~~§12-223-1 Standard heating boilers.~~** ~~The maximum allowable working pressure of standard heating boilers shall in no case exceed the pressure indicated by the manufacturer's identification stamped or cast on the boiler or on a plate secured to it. Boilers constructed to the Canadian Standard CSA B51 shall be registered with the National Board.~~] [Eff 12/6/82; comp 12/6/90; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-2 Safety valves for steam boilers~~**. ~~(a) Each steam boiler shall have one or more ASME and National Board certified safety valves of the spring pop-type adjusted and sealed to discharge at a pressure not to exceed 15 psig. Seals shall be attached in a manner to prevent the valve from being taken apart without breaking the seal. The safety valves shall be arranged so that they cannot be reset to relieve at a higher pressure than the maximum allowable working pressure of the boiler.~~

~~(b) No safety valve for a steam boiler shall be smaller than 3/4 inches unless the boiler and radiating surfaces consist of a self-contained unit. No safety valve shall be larger than 4-1/2 inches. The inlet opening shall have an inside diameter equal to, or greater than, the seat diameter.~~

~~(c) The total minimum relieving capacity of the valve or valves shall be governed by the capacity marking on the boiler. Table 221-1 in section 12-221-5 may be used to determine the required total capacity.~~

~~(d) No valve of any description shall be placed between the safety-relief valve and the boiler, nor on the discharge pipe between the safety-relief valve and the atmosphere. The discharge pipe shall be at least full size and fitted with an open drain to prevent water-lodging in the upper part of the safety-relief valve or in the discharge pipe. Sectional areas of a discharge pipe shall not be less than the full area of the valve outlets discharging thereinto, and the discharge pipe shall be as short and straight as possible and so arranged as to avoid stresses on the valve or valves. When an elbow is placed on the safety-relief valve discharge pipe, it shall be located close to the safety-relief valve outlet; or the discharge pipe shall be securely anchored and supported. When the umbrella or drip pan type of connection is used, the discharge piping shall be so designed as to prevent binding due to expansion. All safety-relief valve discharges shall be so located or piped as not to endanger persons working in the area.~~] [Eff 12/6/82; am 12/19/83; am and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-3 Safety-relief valve requirements for hot water boilers.~~** ~~(a) Each hot water heating boiler or hot water supply boiler shall have at least one ASME and National Board certified safety-relief valve of the automatic reseating type set to relieve at or below the maximum allowable working pressure of the boiler.~~

~~(b) No valve of any description shall be placed between the safety-relief valve and the boiler, nor on the discharge pipe between the safety-relief valve and the atmosphere. The discharge pipe shall be at least full size and fitted with an open drain to prevent water lodging in the upper part of the safety-relief valve or in the discharge pipe. When an elbow is placed on the safety-relief valve discharge pipe, it shall be located close to the safety-relief valve outlet; or the discharge pipe shall be securely anchored and supported. All safety-relief valve discharges shall be so located or piped as not to endanger persons working in the area.~~] [Eff 12/6/82; am and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-223-4 Steam gages**. Each steam boiler shall have a steam gage connected to its steam space, water column, or steam connection, by means of a siphon or an equivalent device exterior to the boiler. The scale on the dial of a steam gage shall be graduated to not less than 30 psig or more than 60 psig.~~] [Eff 12/6/82; am and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-223-5 Pressure or altitude gages and thermometers**. (a) Each hot water boiler shall have a pressure or altitude gage connected to it or to its flow connection in such a manner that it cannot be shut off from the boiler except by a cock with tee or lever handle placed on the pipe near the gage. The handle of the cock shall be parallel to the pipe in which it is located when the cock is open.~~

~~(b) The scale on the dial of the pressure or altitude gage shall be graduated approximately to not less than 1-1/2 nor more than 3 times the maximum allowable working pressure.~~

~~(c) Piping or tubing for pressure or altitude gage connections shall be of nonferrous metal when smaller than 1-inch pipe size.~~

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

~~(e) A combination pressure-temperature gage may be used in place of a separate pressure gage and thermometer provided it is located as required in subsection (d) above.~~] [Eff 12/6/82; am and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-6 Water gage glasses~~**. ~~Each steam boiler shall have one or more water gage glasses attached to the water column or boiler by means of valved fittings. The lower fitting shall be provided with a drain valve or the straightway type with an opening not less than 1/4-inch diameter to facilitate cleaning. Gauge glass replacement shall be possible while the boiler is under pressure. Transparent material, other than glass, may be used for the water gage provided that the material has proved suitable for the pressure, temperature, and corrosive conditions encountered in service~~.] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-7 Automatic low water fuel cutoff or water feeding device~~**. ~~(a) General Requirements for Water Level Controls for Low-Pressure Steam or Vapor Systems Boilers.~~

~~(1) Each low-water fuel cutoff or combined feeder/cutoff device shall conform to the Standard for Limit Controls, UL 353, and~~

shall be accepted by a nationally-recognized testing agency.

(2) Installation diagrams and instructions shall be furnished by the manufacturer.

(3) Low-water fuel cutoffs or combined feeder/cutoff devices shall be located to provide access for servicing, repairing, testing, and inspection.

(4) The low-water fuel cutoff shall have a pressure rating at least equal to the set pressure of the safety valve or safety-relief valve.

(5) In probe-type, low-water cutoffs, an open circuit failure, break, or disconnection of the electrical components or conductors in the safety circuit shall prevent continued operation of the firing mechanism.

(6) Alarms, when used, shall be distinctly audible above the ambient noise level, and may be used in conjunction with indicating lights. They shall be located to alert the operator, or an individual trained as to what action to take when an alarm indicates a potentially dangerous situation is developing.

(b) Requirements for Water Level Controls for Low-Pressure for Steam or Vapor System Boilers.

(1) Each automatically-fired, low-pressure steam or vapor system boiler shall have at least two automatic low-water fuel cutoffs, one of which may be a combined feeder/cutoff device. Each device shall be attached to the boiler by a separate pipe connection. Each cutoff device shall be installed to prevent startup and to cut off the boiler fuel supply automatically, prior to the fall of the surface of the water below the level of the lowest visible part of the gage glass (see also (a)), A water feeding device, when used, shall be constructed and installed so that the water inlet valve cannot feed water into the boiler through the float chamber or its

~~connections to the boiler. The water feeding device shall be located to maintain the operating water level.~~

~~(2)~~ ~~The electrical circuit shall be connected in such a manner that either low-water fuel cutoff control will shut off the fuel supply to the boiler when a low-water condition develops. One cutoff control shall be set to function ahead of the other. Functioning of the lower of the two cutoff controls shall cause a safety shutdown (lockout) requiring manual reset. The manual reset may be incorporated in the lower cutoff control, or may be effected remotely. Where a reset device is separate or remote from the low-water cutoff, a means shall be provided to indicate actuation of the low-water cutoff. The manual rest device may be the instantaneous type, or may include a time delay of not more than 3 minutes after the fuel has been cut off,~~

~~(3)~~ ~~The fuel cutoff device may be inserted internally or attached externally to the boiler. An external cutoff device may be attached to piping connecting a water column to the boiler or combined with a water column. Water column piping and connections shall be at least 1 inch NPS. If the lower water fuel cutoff is connected to the boiler by pipe or fittings, no shutoff valves of any type shall be placed in such piping. A cross, or equivalent fitting, shall be placed in the water piping connection at every right angle to facilitate cleaning and inspection. Fuel cutoff devices embodying a separate chamber shall have a vertical drain-pipe and a blowoff valve, not less than 3/4 inch NPS, located at the lowest point of the chamber or water-equalizing pipe connections so that the chamber and the equalizing pipe can be flushed and the device tested.~~

~~(4) A low-water fuel cutoff or combined feeder/cutoff device may also be installed in the tapped openings available for attaching a water gage glass directly to a boiler, provided the connections are made to the boiler with nonferrous tees or wyes not less than 1/2 inch NPS between the boiler and the water gage glass so that the water gage glass is attached directly and as close as possible to the boiler; the run of the tee or wye shall take the water glass fitting, and the side outlet or branch of the tee or wye shall take the low-water fuel cutoff or combined feeder/cutoff device. The ends of all nipples shall be hollowed to full-size diameter.~~

~~(5) A system may incorporate a time-delay component with the low-water fuel cutoff device to prevent short cycling. This component shall not constrict any connecting piping, and the time delay shall not exceed the boiler manufacturer's recommended timing or 90 seconds, whichever is less. The device shall cut off the fuel supply when the water fails to the lowest visible part of the gage glass~~.] [Eff 12/6/82; am and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-8 Feedwater connections~~**. ~~(a) Feedwater, make-up water, or water treatment shall be introduced into a boiler through the return piping system or through an independent feedwater connection which does not discharge against parts of the boiler exposed to direct radiant heat from the fire. Feedwater, make-up water, or water treatment shall not be introduced through openings or connections provided for inspection or cleaning, safety valves, safety relief valves, surface blowoff, water columns, water-gage glasses, pressure gages, or temperature gages.~~

~~(b) Feedwater pipe shall be provided with a check valve near the boiler and a stop valve or cock between the check valve and the boiler or return pipe system.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-9 Check valves and vacuum breakers~~**. ~~Each hot water boiler or bank of hot water boilers having common cold water supply piping shall be equipped with a check valve ahead of the stop valve unless the supply piping is so installed as to prevent emptying of the boiler in case of failure of the supply-water pressure. This may be accomplished by installing a vacuum breaker in the supply piping at a point higher than the hot water boiler.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-10 Repairs and renewals of fittings and appliances.~~** ~~Whenever repairs are made to fittings or appliances, or it becomes necessary to replace them, the work must comply with the requirements for new installations.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-11 Clearances~~**. ~~Clearances around hot water supply or heating boilers shall not be less than:~~

~~(1) Three feet on the side with operating controls;~~

~~(2) Eighteen inches between the boiler and the adjacent walls or other structures;~~

~~(3) Three feet between the top of the boiler proper and the lowest obstruction located above (i.e., beams, piping, ceiling etc.); and~~

~~(4) Five feet opposite any manhole~~.]
[Eff 12/8/86; am and comp 12/6/90;
R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-12 Stop valves~~**. ~~(a) Stop valves in the outlet, inlet, and return-pipe connections shall be installed as near the boiler nozzle as practicable.~~

~~(b) The minimum pressure rating of all valves or cocks shall be at least equal to the pressure stamped on the boiler; and the temperature setting of such valves or cocks, including all internal components, shall be not less than 250° F (121.1° C).~~] [Eff 12/8/86; am and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-13 Drain valves~~**. ~~All low-pressure steam boilers and low-pressure steam cookers shall be fitted with valves or cocks connecting to the lowest water-containing spaces. The minimum size of the drain piping, valves, and cocks shall be 3/4 inch. The discharge piping shall be full size to the point of discharge.~~] [Eff and comp 12/6/90;
R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-14 Controls and safety devices~~**. ~~The requirements of ASME CSD-1 controls and safety devices for automatically fired boilers shall apply.~~] [Eff 7/6/98; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-223-15 Pool heaters~~**. ~~All pool heaters exceeding a heat input of 200,000 Btu per hour shall be~~

~~constructed in accordance with Section IV of the ASME Code and installed per the rules of these standards. All heaters shall be provided with isolating valves, a drain valve, a pressure relief valve, and temperature and pressure gauge.~~] [Eff 11/18/12; R] (Auth: §397-4) (Imp: HRS §397-4)

[**~~§12-223-16 Inspection frequency~~**. ~~All low pressure steam boilers with a heat input exceeding 400,000 Btu per hour, or a heating surface greater than 100 square feet, or having a manway shall be inspected on a power boiler frequency.~~]" [Eff 11/18/12; R] (Auth: §397-4) (Imp: HRS §397-4)

7. Chapter 12-223.1, Hawaii Administrative Rules, entitled "Heating Boilers - Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Portable Water Heaters", is adopted to read as follows:

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILER AND PRESSURE VESSELS

CHAPTER 223.1

HEATING BOILERS – STEAM HEATING BOILERS, HOT-WATER HEATING BOILERS, HOT-WATER SUPPLY BOILERS, AND POTABLE WATER HEATERS

Historical Note: This chapter is based substantially upon chapter 223. [Eff 12/6/82; am 12/9/83; am and comp 12/6/90; am 7/6/98; am 11/18/12; R]

§12-223.1-1 Scope. Service limitations. The requirements of this section shall apply to heating boilers including steam heating boilers not exceeding fifteen (15) psig, hot-water heating boilers, hot-water supply boilers, and potable water heaters, but not limited to the following:

(1) Steam heating boiler: steam or vapor boiler operating at pressures not exceeding fifteen (15) psig;
(2) Hot-water heating boiler: hot-water boiler installed to operate at pressures not exceeding 160 psig or temperatures more than 250 degrees Fahrenheit;
(3) Hot-water supply boiler: a boiler that furnishes hot water to be used externally to

itself at a pressure less than or equal to 160 psig or a temperature less than or equal to 250 degrees Fahrenheit at or near the boiler outlet;

(4) Modular boiler: a steam or hot-water heating assembly consisting of a group of individual heating boilers called modules, without intervening stop valves in between the modules, intended to be installed as a system unit, with a single inlet and single outlet. Modules may be under one jacket or may be individually jacketed;

(5) Pool heater: a boiler in which no steam is generated, from which hot water is circulated to a swimming pool, hot tub, or spa and returned to the boiler, and which operates at a pressure not exceeding 160 psig or a temperature not exceeding 250 degrees Fahrenheit;

(6) Potable water heaters: a corrosion resistant appliance that includes the controls and safety devices to supply potable hot water at pressure not exceeding 160 psig and temperature not more than 210 degrees Fahrenheit and includes the following types:

(A) Fired storage water heater: a potable water heater in which water is heated by electricity, the combustion of solid, liquid, or gaseous fuels, and stores water within the same appliance;

(B) Indirect fired water heater: a potable water heater in which water is heated by an internal coil or heat exchanger that receives its heat from an external source. Indirect fired water heaters provide water directly to the system or store water within the same appliance; and

(C) Circulating water heater: a potable water heater which furnishes water directly to the system or to a separate storage tank. Circulating water heaters

may be either natural or forced flow; and

(7) Modular water heaters: a hot-water heating assembly consisting of a group of individual water heaters called modules having an aggregate input value greater than 200,000 Btu per hour (58.6 KW), with or without intervening stop valves in between the modules, intended to be installed as a system unit, with a single inlet and single outlet. Modules may be under one jacket or may be individually jacketed. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

12-223.1-2 General requirements for heating boilers. (a) The following shall apply to all heating boilers:

(1) All heating boilers in operation in this jurisdiction shall have a current and valid operating permit issued to a specific location by the department;

(2) Changes in location or ownership shall require department notification and may require reinspection;

(3) Heating boilers shall bear the ASME Code Symbol Stamp "H", "HLW" or ASME certification mark with "H", "HLW" designator and the NB registration number;

(4) ASME and NB stamping shall be legible and not be concealed by insulation or paint; and

(5) Upon completion of the installation of a new heating boiler, it shall be marked by the inspector employed by the department with a state serial number, consisting of letters and figures to be not less than 5/16 inch in height and arranged as HHB####-Year.

(b) Steam heating boilers not in use for a period of one year or more, for any reason, shall be inspected

internally and externally before being placed into operation.

(c) Replacement of an existing heating boiler shall be in accordance with the requirements for new boiler installations.

(d) Replacement of a heating boiler at an existing location with a used or secondhand boiler shall comply with the requirements of new boiler installations. The following shall apply to used or secondhand heating boilers:

(1) Used or secondhand heating boilers when installed in this jurisdiction, shall be equipped with fittings and appurtenances that comply with new installations; and

(2) Weld repairs, alterations, and inspection records shall be submitted with the installation application for used or second-hand heating boilers.

(e) Replacement or repairs to boiler fittings, appurtenances or appliances, controls and safety devices, shall comply with the requirements for new installations and applicable ASME BPVC and NBIC sections.

(f) Galvanized pipe shall not be used for steam supply and blowdown piping.

(g) State specials: applicable provisions include sections 12-220-2(b) and 12-220-16(e)(6). [Eff and comp] (Auth: §397-4) (Imp: HRS §397-4)

12-223.1-3 Responsibility of owners and users. The following are requirements of owners and users:

(1) The owner or user of the pressure retaining item is responsible for ensuring that all equipment meets all the requirements of the department at the point of installation including licensing, registration, and certification of those performing installations. The department may require additional safety standards and when a

conflict arises, the rules of the department shall prevail;

(2) Owners or users shall ensure heating boilers are operated only with a valid operating permit. The operation of a heating boiler with an expired operating permit is not allowed and may be subject to penalties as described in this part. Changes in location or ownership shall require notification of the department and may require reinspection;

(3) Owners or users shall ensure operating permit renewal inspections are completed prior to the permit expiration date. It is the responsibility of the owner or user to schedule boiler permit renewal inspections. Permit renewal inspections shall include boiler shutdown, dismantling, internal inspection where applicable, and testing of controls and safety devices;

(4) Additional inspection requirements may be conducted at the inspector's discretion, e.g., internal inspections, pressure tests, and non-destructive exams (NDEs);

(5) Request for the extension of the operating permit expiration date may be considered for valid reasons by submitting a written request to the chief boiler inspector;

(6) The unavailability of the special inspector to conduct inspections is not a valid reason for requesting permit extensions; deputy inspectors may perform the inspection in the absence of the special inspectors;

(7) When a boiler task is required, it is the owner or the owner's designee that is expected to perform such task, however, the owner retains responsibility for compliance; and

(8) Owners or users are responsible to ensure compliance with the preventive maintenance requirements as specified in 12-223.1-14.

[Eff and comp] (Auth: §397-4) (Imp: HRS §397-4)

§12-223.1-4 Inspections. (a) Initial heating boiler acceptance inspections shall be conducted and witnessed by the chief boiler inspector or a deputy inspector designee. The initial inspection shall include internal inspection where construction permits, post-installation pressure test in accordance with the requirements of the original code of construction, and operational testing of controls and safety devices in accordance with ASME CSD-1, NBIC, and this chapter by the installer, contractor, or owner.

(b) Permit renewal inspections. The following shall apply to permit renewal inspections:

(1) Steam or vapor heating boilers shall have an external inspection every two years, or where construction permits, an internal inspection at the discretion of the inspector;

(2) Steam or vapor heating boilers with a heating surface greater than twenty (20) square feet and less than or equal to one hundred (100) square feet shall be internally inspected at least every four years;

(3) Steam or vapor heating boilers with any one of the following criteria: a manway, a Btu per hour input greater than 400,000, or a heating surface greater than one hundred (100) square feet, shall be internally inspected annually. They shall be externally inspected and operationally tested approximately six months after the internal inspection;

(4) Hot-water heating, hot-water supply heating boilers, potable water heaters (including modular installations) shall have an external inspection every two years, or where construction permits, an internal inspection at the discretion of the inspector;

(5) Pool heaters shall have an external inspection every two years;

(6) State special: see sections 12-220-2(b) and 12-220-16(e)(6); and

(7) Based upon actual service conditions by the owner or user of the operating equipment, the

department may, at its discretion, permit variations in the inspection frequency requirements. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

12-223.1-5 Technical installation requirements. (a) General requirements. The following shall apply to all heating boilers:

(1) Heating boilers shall be installed pursuant to sections 12-220-2, 12-220-2.1, 12-220-5, 12-220-6, 12-220-15, and this chapter;

(2) Owners and users shall adhere to the heating boiler installation requirements as specified in the NBIC Part 1;

(3) An application for installation permit shall be submitted to the department prior to commencement of work;

(4) Heating boilers installed without an installation permit may be subject to penalties of up to $10,000 per day pursuant to section 12-220-22;

(5) Only contractors holding a valid Hawaii C-4 contractor license shall install steam heating, hot-water heating, hot-water supply heating boilers, and water heaters with more than 200,000 Btu per hour (58.6 KW);

(6) Contractors holding a valid Hawaii C-37 contractor license may install water heaters up to 200,000 Btu per hour; and

(7) All heating boilers shall be equipped with controls and safety devices based upon the Btu per hour burner input, as specified in the original code of construction.

(b) First acceptance inspection and certification requirements shall include the following:

(1) The owner and contractor shall comply with section 12-220-2.1 and upon completion of the installation, shall arrange for an acceptance inspection by the department;

(2) For heating boilers subject to ASME CSD-1 requirements, the installing contractor shall operationally test the controls and safety devices prior to scheduling the first acceptance inspection with the department, and record the results on form CG-500, ASME CSD-1 (Exhibit 4), and file a copy with the department;

(3) Additional inspection requirements may be conducted at the inspector's discretion, e.g. internal inspections, pressure tests, and non-destructive exams (NDEs);

(4) The installing contractor shall test the boiler as directed and witnessed by the chief boiler inspector or designated deputy inspector;

(5) The chief boiler inspector or designated deputy inspector shall conduct the first data inspection, acceptance, and mark the state serial number on the heating boiler pursuant to section 12-220-29.1; and

(6) The installer shall complete and certify the NB Boiler Installation Report I-1 (NB-365, see Exhibit 3) after the completion, inspection, and acceptance of the installation by an inspector employed by the department. The NB Boiler Installation Report I-1 (NB365, see Exhibit 3) shall be submitted to the owner and the department.

(c) The following shall apply to heating boiler clearances:

(1) Heating boilers shall have a minimum distance of at least thirty-six (36) inches between the top of the heating boiler and any overhead structure and at least thirty-six (36) inches between all sides of the heating boiler and adjacent walls, structures, or other equipment. Heating boilers with manholes shall have at least eighty-four (84) inches of clearance between the manhole opening and any wall, ceiling, piping, or other equipment that may prevent a person

from entering the heating boiler. Alternative clearances in accordance with the manufacturer's recommendations are subject to acceptance by the jurisdiction;

(2) Modular heating boilers that require individual units to be set side by side, front to back, or by stacking shall provide clearances in accordance with the manufacturer's recommendations and subject to acceptance by the department;

(3) Heating boilers shall be located so that adequate space is provided for proper operation, maintenance, and inspection of equipment and appurtenances, which shall include the removal of tubes if applicable;

(4) Heating boilers with a top opening manhole shall have at least eighty-four (84) inches of unobstructed clearance above the manhole to the ceiling of the equipment room; and

(5) Heating boilers with a bottom opening used for inspection or maintenance shall have at least twelve (12) inches of unobstructed clearance. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

12-223.1-6 Controls and safety devices. Where applicable, steam heating, hot-water heating, and hot-water supply heating boilers, shall be equipped with controls and safety devices as specified in the original code of construction, and in accordance with ASME CSD-1. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

12-223.1-7 Instruments, fittings, and controls. (a) The following shall apply to steam heating boilers:

(1) Gages. The following shall apply to gages:

(A) Each steam boiler shall have a steam gage, or a compound steam gage connected to its steam space or to its water column or to its steam connection. The gage or connection shall contain a siphon or equivalent device that will develop and maintain a water seal that will prevent steam from entering the gage tube. The connection shall be so arranged that the gage cannot be shut off from the boiler except by a cock placed in the pipe at the gage and provided with a tee-handle or lever-handle arranged to be parallel to the pipe in which it is located when the cock is open. The connections to the boiler shall be not less than NPS 1/4. Where steel or wrought iron pipe or tubing is used, the connection and external siphon shall be not less than NPS 1/2. The minimum size of a siphon, if used, shall be NPS 1/4. Ferrous and nonferrous tubing having inside diameters at least equal to that of standard pipe sizes listed above may be substituted for pipe; and

(B) The scale on the dial of a steam boiler gage shall be graduated to not less than thirty (30) psig nor more than sixty (60) psig. The travel of the pointer from zero (0) psig to thirty (30) psig pressure shall be at least three (3) inches;

(2) Water gage glasses. The following shall apply to water gage glasses:

(A) Each steam boiler shall have one or more water-gage glasses attached to the water column or boiler by means of valved fittings not less than NPS 1/2, with the lower fitting provided with a drain valve of a type having an unrestricted drain opening not less than NPS 1/4 to

facilitate cleaning. Gage glass replacement shall be possible under pressure. Water glass fittings may be attached directly to a boiler. Heating boilers having an internal vertical height of less than ten (10) inches should be equipped with a water level indicator of the glass bulls-eye type provided the indicator is of sufficient size to show the water at both normal operating and low-water cutoff levels;

(B) The lowest visible part of the water-gage glass shall be at least one (1) inch above the lowest permissible water level recommended by the boiler manufacturer. With the boiler operating at this lowest permissible water level, there shall be no danger of overheating any part of the boiler;

(C) In electric heating boilers of the submerged electrode type, the water-gage glass shall be so located to indicate the water levels both at startup and under maximum steam load conditions as established by the manufacturer;

(D) In electric heating boilers of the resistance element type, the lowest visible part of the water gage shall be located at least one (1) inch above the lowest permissible water level specified by the manufacturer. Each electric boiler of this type shall also be equipped with an automatic low-water cutoff on each boiler so located as to automatically cut off the power supply to the heating elements before the surface of the water falls below the visible part of the glass;

(E) Tubular water glasses on electric heating boilers having a normal water content not exceeding 100 gallons shall

be equipped with a protective shield; and

(F) Transparent material other than glass may be used for the water gage provided that the material will remain transparent and has proved suitable for the pressure, temperature, and corrosive conditions expected in service;

(3) Water column and water level control pipes. The following shall apply to water column and water level control pipes:

(A) The minimum size of ferrous or nonferrous pipes connecting a water column to a steam boiler shall be NPS 1. No outlet connections, except for damper regulator, feedwater regulator, steam gages, or apparatus that does not permit the escape of any steam or water except for manually operated blowdown, shall be attached to a water column or the piping connecting a water column to a boiler for introduction of feedwater into a boiler. If the water column, gage glass, low-water fuel cutoff, or other water level control device is connected to the boiler by pipe and fittings, no shutoff valves of any type shall be placed in such pipe and a cross or equivalent fitting to which a drain valve and piping may be attached shall be placed in the water piping connection at every right angle turn to facilitate cleaning and inspection. The water column drain pipe and valve shall be not less than 3/4-inch diameter; and

(B) The steam connections to the water column of a horizontal firetube wrought boiler shall be taken from the top of the shell or the upper part of the head, and the water connection shall be taken from a point not above the center line of the shell. For a cast-iron boiler,

the steam connection to the water column shall be taken from the top of an end section or the top of the steam header, and the water connection shall be made on an end section not less than six (6) inches below the bottom connection to the water-gage glass;

(4) Pressure control. The following shall apply to pressure control:

(A) Each automatically fired steam boiler shall be protected from overpressure by two pressure-operated controls. Each individual steam boiler or each system of commonly connected steam heating boilers shall have a control that will cut off the fuel supply when the steam pressure reaches an operating limit, which shall be less than the maximum allowable pressure;

(B) Each individual automatically fired steam boiler shall have a safety limit control, with a manual reset that will cut off the fuel supply to prevent steam pressure from exceeding the fifteen (15) psig maximum allowable working pressure of the boiler. Each control shall be constructed to prevent a pressure setting above fifteen (15) psig; and

(C) Shutoff valves of any type shall not be placed in the steam pressure connection between the boiler and the controls described in subparagraphs (A) and (B). These controls shall be protected with a siphon or equivalent means of maintaining a water seal that will prevent steam from entering the control. The connections to the boiler shall not be less than NPS 1/4, but where steel or wrought iron pipe or tubing is used, they shall not be less than NPS 1/2. The minimum size of an external siphon shall be NPS 1/4 or 3/8 inch outside diameter

nonferrous tubing. For manifold connections, the minimum size shall be as specified in the original code of construction; and

(5) Automatic low-water fuel cutoff and water feeding devices. The following shall apply to automatic low-water fuel cutoff and water feeding devices:

(A) Each automatically fired steam or vapor system boiler shall have an automatic low-water fuel cutoff so located as to automatically cut off the fuel supply when the surface of the water falls to the lowest visible part of the water-gage glass. If a water feeding device is installed, it shall be so constructed that the water inlet valve cannot feed water into the boiler through the float chamber and so located as to supply requisite feedwater;

(B) Such a fuel cutoff or water feeding device may be attached directly to a boiler. A fuel cutoff or water feeding device may also be installed in the tapped openings available for attaching a water glass directly to a boiler, provided the connections are made to the boiler with nonferrous tees or Y fittings not less than NPS 1/2 between the boiler and water glass so that the water glass is attached directly and as close as possible to the boiler; the run of the tee or Y-fitting shall take the water glass fittings, and the side outlet or branch of the tee or Y-fittings shall take the fuel cutoff or water feeding device. The ends of all nipples shall be reamed to full-size diameter;

(C) In addition to the requirements in subparagraphs (A) and (B), a secondary low-water fuel cutoff with manual reset

shall be provided on each automatically fired steam or vapor system boiler; and

(D) Fuel cutoffs and water feeding devices embodying a separate chamber shall have a vertical drain pipe and a blowoff valve not less than NPS 3/4, located at the lowest point in the water equalizing pipe connections so that the chamber and the equalizing pipe can be flushed and the device tested.

(b) Hot-water heating or hot-water supply boilers. The following shall apply to hot-water heating or hot-water supply boilers:

(1) Pressure or altitude gages:

(A) Each hot-water heating or hot-water supply boiler shall have a pressure or altitude gage connected to it or to its flow connection in such a manner that it cannot be shut off from the boiler except by a cock with tee or lever handle, placed on the pipe near the gage. The handle of the cock shall be parallel to the pipe in which it is located when the cock is open;

(B) The scale on the dial of the pressure or altitude gage shall be graduated approximately to not less than one and a half (1-1/2) nor more than three and a half (3-1/2) times the pressure at which the safety relief valve is set; and

(C) Piping or tubing for pressure or altitude gage connections shall be of nonferrous metal when smaller than NPS 1;

(2) Thermometers: each hot-water heating or hot-water supply boiler shall have a thermometer so located and connected that it shall be easily readable. The thermometer shall be so located that it shall always indicate the temperature of the water in the boiler at or near the outlet;

(3) Temperature controls. Each automatically fired hot-water heating or hot-water supply boiler shall be protected from over-temperature by two temperature-operated controls. The following shall apply to automatically fired hot-water heating and hot-water supply boilers:

(A) Each individual hot-water heating or hot-water supply boiler or each system of commonly connected heating boilers shall have a control that will cut off the fuel supply when the water temperature reaches an operating limit, which shall be less than the maximum allowable temperature; and

(B) Each individual automatically fired hot-water heating or hot-water supply boiler shall have a safety limit control with manual reset that will cut off the fuel supply to prevent the water temperature from exceeding the maximum allowable temperature at the boiler outlet; and

(4) Low-water fuel cutoff. The following shall apply to automatically fired hot-water heating boilers:

(A) Each automatically fired hot-water heating boiler shall have an automatic low-water fuel cutoff with manual reset. The low-water fuel cutoff shall be designed for hot-water service, and it shall be so located as to automatically cut off the fuel supply when the surface of the water falls to the level established in subparagraph (B);

(B) As there is no normal waterline to be maintained in a hot-water boiler, any location of the low-water fuel cutoff above the lowest safe permissible water level established by the boiler manufacturer is satisfactory;

(C) In lieu of the requirements for low-water fuel cutoffs in subparagraph (A),

heating boilers requiring forced circulation to prevent overheating of the tubes, coils, or vessel, shall have an accepted flow-sensing or temperature-sensing device to prevent burner operation at a flow rate inadequate to protect the boiler unit against overheating at all allowable firing rates. This safety control(s) shall shut down the burner and prevent restarting until an adequate flow is restored and shall be independent of all other controls; and

(D) A means shall be provided for testing the operation of the external low-water fuel cutoff without resorting to draining the entire system. Such means shall not render the device inoperable except as follows: if the means temporarily isolates the device from the boiler during this testing, it shall automatically return to its normal position. The connection may be so arranged that the device cannot be shut off from the boiler except by a cock placed at the device and provided with a tee or lever-handle arranged to be parallel to the pipe in which it is located when the cock is open;

(c) Potable water heaters. The following shall apply to potable water heaters:

(1) Temperature controls. The following shall apply to the temperature controls of potable water heaters:

(A) Each individual automatically fired water heater, in addition to the operating control used for normal water heater operation, shall have a separate high limit temperature actuated combustion control that will automatically cut off the fuel supply.

The temperature range of the high limit temperature actuated control shall not allow a setting over 210 degrees Fahrenheit;

(B) Gas-fired water heaters: the high limit temperature control when actuated shall shut off the fuel supply with a shutoff means other than the operating control valve. Separate valves may have a common body;

(C) Electrically heated water heaters: the high limit temperature control when actuated shall cut off all power to the operating controls;

(D) Oil-fired water heaters: the high limit temperature control when actuated shall cut off all current flow to the burner mechanism; and

(E) Indirect water heating systems: the high limit temperature control when activated shall cut off the source of heat;

(2) Pressure or altitude gages. The following shall apply to pressure or altitude gages:

(A) Each potable water heater shall have a pressure or altitude gage connected to it or to its flow connection in such a manner that it cannot be shut off from the boiler except by a cock with tee or lever handle placed on the pipe near the gage. The handle of the cock shall be parallel to the pipe in which it is located when the cock is open;

(B) The scale on the dial of the pressure or altitude gage shall be graduated approximately to not less than one and a half (1-1/2) nor more than three (3) times the maximum allowable working pressure; and

(C) Piping or tubing for pressure or altitude gage connections shall be of nonferrous metal when smaller than 1-inch pipe size;

(3) Thermometers: each installed water heater shall have a thermometer so located and connected that it shall be easily readable. The thermometer shall be so located that it shall always indicate the temperature of the water in the water heater at or near the outlet; and

(4) Flow-sensing device: potable water heaters requiring forced circulation to prevent overheating of the tubes, coils, or vessel should have an acceptable flow-sensing device or temperature-sensing device to prevent burner operation at a flow rate inadequate to protect the water heater unit against overheating at all allowable firing rates. This safety controls shall shut down the burner and prevent restarting until an adequate flow is restored and shall be independent of all other controls.

[Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

12-223.1-8 Modular steam heating, modular hot-water heating boilers, and modular water heaters. (a) Individual modules. The following shall apply to individual modules:

(1) The individual modules shall comply with all the requirements of the code of construction. The individual modules shall be limited to a maximum input of 400,000 Btu per hour (117 kw/hr) for gas, 3 gallons/hour (11.4 l/hr) for oil, or 117 kw for electricity;

(2) Each module of a modular steam heating boiler shall be equipped with a:

(A) Safety valve, see section 12-223.1-9(a)(1);
(B) Blowoff valve, see section 12-223.1-13(o)(1); and
(C) Drain valve, see section 12-223.1-13(o)(2); and

(3) Each module of a modular hot-water heating boiler shall be equipped with a:
(A) Safety relief valve, see section 12-223.1-9(a)(2); and
(B) Drain valve, see section 12-223.1-13(o)(2).

(b) Assembled Modular Heating boilers. The following shall apply to assembled modular heating boilers:

(1) The individual modules shall be manifolded together at the job site without any intervening valves;

(2) The assembled modular steam heating boiler shall also be equipped with a:
(A) Feedwater connection, see Exhibit 5 and 6; and
(B) Return pipe connection, see Exhibit 5 and 6; and

(3) The assembled modular hot-water boiler shall also be equipped with a:
(A) Makeup water connection, see Exhibit 7;
(B) Provision for thermal expansion, see Exhibit 7 and Exhibit 8; and
(C) Stop valves, see Exhibit 7 (treating the assembled modular boiler as a single unit).

(c) Modular hot-water heating boilers. The following shall apply to modular hot-water heating boilers:

(1) Each module of a modular hot-water heating boiler shall be equipped with a:
(A) Pressure or altitude gage, see section 12-223.1-7(b)(1);
(B) Thermometer, see section 12-223.1-7(b)(2); and

(C) Temperature control, see section 12-223.1-7(b)(3)(A); and

(2) The assembled modular hot-water heating boiler shall be equipped with a:

(A) Temperature control, see 12-223.1-7(b)(3)(B); and

(B) Low-water fuel cutoff, see 12-223.1-7(b)(4).

(d) Modular steam heating boilers. The following shall apply to modular steam heating boilers:

(1) Each module of a modular steam boiler shall be equipped with a:

(A) Steam gage, see section 12-223.1-7(a)(1);

(B) Water-gage glass, see section 12-223.1-7(a)(2);

(C) Pressure control, see section 12-223.1-7(a)(4)(A); and

(D) Low-water cutoff, see section 12-223.1-7(a)(5); and

(2) The assembled modular steam heating boiler shall also be equipped with a pressure control, see 1 section 12-223.1-7(a)(4)(B)).

(e) Modular water heaters. The individual modules shall comply with all the requirements of the code of construction and this paragraph. Each module of a modular water heater shall be equipped with a:

(1) Safety relief valve, see section 12-223.1-9(a)(3);

(2) Drain valve, see section 12-223.1- 13(o)(2);

(3) Pressure or altitude gage, see section 12-223.1-7(c)(2);

(4) Thermometer, see section 12-223.1-7(c)(3);

(5) Temperature control, see section 12-223.1-7(c)(1); and

(6) Flow-sensing Device, see section 12-223.1-7(c)(4).

(f) Assembled modular water heaters having an aggregate input value greater than 200,000 Btu per hour or aggregate water containing capacity greater than 120 gallons. The individual modules shall be manifolded together at the job site with or without any

intervening valves. The assembled modular potable water heater shall be equipped with a:

(1) Safety relief valve, see section 12-223.1-9(a)(3);
(2) Drain valve, see section 12-223.1-13(o)(2);
(3) Pressure/altitude gage, see 12-223.1-7(c)(2);
(4) Thermometer, see section 12-223.1-7(c)(3);
(5) Temperature control, see section 12-223.1-7(c)(1); and
(6) Flow-sensing device, see 12-223.1-7(c)(4).

[Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-223.1-9 Pressure relief valves for steam heating, hot-water heating, hot-water supply boilers, and potable water heaters. Pressure relief valves for steam heating, hot-water heating, hot-water supply boilers, and potable water heaters shall be ASME and NB certified and marked with the ASME certification mark and "HV" designator, and National Board "NB" symbols. The following shall apply to these objects:

(1) Pressure relief valve requirements for steam heating boilers shall include the following:
    (A) Pressure relief valves shall be manufactured in accordance with a national or international standard;
    (B) Each steam boiler shall have one or more NB capacity certified pressure relief valves of the spring pop type adjusted and sealed to discharge at a pressure not to exceed fifteen (15) psig;
    (C) No pressure relief valve for a steam boiler shall be smaller than NPS 1/2. No pressure relief valve shall be larger than NPS 4. The inlet opening shall have an inside diameter equal to or greater than the seat diameter;
    (D) The minimum valve capacity in lbs./hr. shall be the greater of that determined by dividing the maximum Btu per hour

output at the boiler nozzle obtained by the firing of any fuel for which the unit is installed by 1,000 Btu per hour/lbs., or shall be determined based on the lbs. of steam/hr/square feet of boiler heating surface. For cast iron heating boilers, the minimum valve capacity shall be determined by the maximum output method. In many cases a greater relieving capacity of valves will have to be provided than the minimum specified in this chapter (see Exhibit 10). In every case the requirements of subparagraph (E) shall be met;

(E) The pressure relief valve capacity for each steam boiler shall be such that with the fuel burning equipment installed, and operated at maximum capacity, the pressure cannot rise more than five (5) psig above the maximum allowable working pressure; and

(F) When operating conditions are changed, or additional boiler heating surface is installed, the valve capacity shall be increased, if necessary, to meet the new conditions and be in accordance with section 12-223.1-9(a)(2)(G). The additional valves required, because of changed conditions, may be installed on the outlet piping provided there is no intervening valve; and

(2) Pressure relief valve requirements for hot-water heating or hot-water supply heating boilers shall include the following:

(A) Each hot-water heating or hot-water supply boiler shall have at least one NB capacity certified pressure relief valve, of the automatic reseating type set to relieve at or below the maximum allowable working pressure of the boiler;

(B) Hot-water heating or hot-water supply heating boilers limited to a water temperature not more than 210 degrees Fahrenheit may have, in lieu of the valve(s) specified in subparagraph(A), one or more NB capacity certified temperature and pressure relief valves of the automatic reseating type set to relieve at or below the maximum allowable working pressure of the boiler;

(C) When more than one pressure relief valve is used on either hot-water heating or hot-water supply heating boilers, the additional valves shall be NB capacity certified and may have a set pressure within a range not to exceed six (6) psig above the maximum allowable working pressure of the boiler up to and including sixty (60) psig, and five per cent (5%) for those having a maximum allowable working pressure exceeding sixty (60) psig;

(D) No pressure relief valve shall be smaller than NPS 3/4 nor larger than NPS 4, except that heating boilers having a heat input not greater than 15,000 Btu per hour should be equipped with a rated pressure relief valve of NPS 1/2;

(E) The required relieving capacity, in lbs./hr, of the pressure relief device or devices on a boiler shall be the greater of that determined by dividing the maximum output in Btu per hour at the boiler nozzle obtained by the firing of any fuel for which the unit is installed by 1,000 Btu per hour/lb., or shall be determined on the basis of lbs. steam/hr/square feet as given in Exhibit 9. For cast iron heating boilers, the minimum valve capacity shall be determined by the maximum output method.

In many cases a greater relieving capacity of valves will have to be provided than the minimum specified in this chapter. In every case the requirements of subparagraph (G) shall be met;

(F) When operating conditions are changed, or additional boiler heating surface is installed, the valve capacity shall be increased, if necessary, to meet the new conditions and shall be in accordance with NBIC Part 1. The additional valves required, on account of changed conditions, may be installed on the outlet piping provided there is no intervening valve; and

(G) Pressure relief valve capacity for each boiler with a single pressure relief valve shall be such that, with the fuel burning equipment installed and operated at maximum capacity, the pressure cannot rise more than ten per cent (10%) above the maximum allowable working pressure. When more than one pressure relief valve is used, the over pressure shall be limited to ten per cent (10%) above the set pressure of the highest set valve; and

(3) Pressure relief valve requirements for potable water heaters shall include the following:

(A) Each water heater shall have at least one NB capacity certified temperature and pressure relief valve. No temperature and pressure relief valve shall be smaller than NPS 3/4;

(B) Pressure relief valves for potable water heaters shall be ASME and NB certified marked with the ASME certification mark and "HV" designator, and National Board "NB" symbols;

(C) The pressure setting shall be less than or equal to the maximum allowable working pressure of the water heater. However, if any of the other components in the hot-water supply system (such as valves, pumps, expansion, storage tanks, or piping) have a lesser working pressure rating than the water heater, the pressure setting for the temperature and pressure relief valve(s) shall be based upon the component with the lowest maximum allowable working pressure rating. If more than one temperature and pressure relief valve is used, the additional valve(s) may be set within a range not to exceed ten per cent (10%) over the set pressure of the first valve;

(D) The required relieving capacity in Btu per hour of the temperature and pressure relief valve shall not be less than the maximum allowable input unless the water heater is marked with the rated burner input capacity of the water heater on the casing in a readily visible location, in which case the rated burner input capacity may be used as a basis for sizing the temperature pressure relief valves. The relieving capacity for electric water heaters shall be 3,500 Btu per hour per kw of input;

(E) The relieving capacity for electric water heaters shall be 3,500 Btu per hour (1.0 kw) per kw of input. In every case, the temperature and pressure relief valve capacity for each water heater shall be such that with the fuel burning equipment installed and operated at maximum capacity, the pressure cannot rise more than ten per cent (10%) above the maximum allowable working pressure;

(F) Many temperature and pressure relief valves have a NB capacity certified rating which was determined according to ASME BPVC requirements, and a lower Canadian Standards Association (CSA) rating value. Where the ASME BPVC is the only referenced code of construction the NB capacity certified rating may be used; and

(G) If operating conditions are changed or additional heating surface is installed, the temperature and pressure relief valve capacity shall be increased, if necessary, to meet the new conditions and shall be in accordance with the above provisions. In no case shall the increased input capacity exceed the maximum allowable input capacity. The additional valves required, because of changed conditions, may be installed on the outlet piping providing there is no intervening valve. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-223.1-10 Acceptable installation of pressure relief valves for steam heating, hot-water heating, hot-water supply boilers. The following shall apply to the installation of pressure relief valves for steam heating, hot-water heating, and hot-water supply boilers:

(1) Pressure relief valves shall be located at the top side of the boiler. The top side of the boiler shall mean the highest practicable part of the boiler proper but in no case shall the safety valves be located below the normal operating level and in no case shall the pressure relief valve be located below the lowest permissible water level. They shall be connected directly to a tapped or

flanged opening in the boiler, to a fitting connected to the boiler by a short nipple, to a Y-base, or to a valveless header connecting steam or water outlets on the same boiler. Coil or header type heating boilers shall have the pressure relief valve located on the steam or hot-water outlet end. Pressure relief valves shall be installed with their spindles vertical. The opening or connection between the boiler and any pressure relief valve shall have at least the area of the valve inlet;

(2) When a boiler is fitted with two or more pressure relief valves on one connection, this connection shall have a cross-sectional area not less than the combined areas of inlet connections of all the pressure relief valves with which it connects;

(3) When a Y-base is used, the inlet area shall be not less than the combined outlet areas. When the size of the boiler requires a pressure relief valve larger than NPS 4, two or more valves having the required combined capacity shall be used. When two or more valves are used on a boiler, they may be single, directly attached, or installed on a Y-base;

(4) A threaded connection may be used for attaching a valve;

(5) Pressure relief valves shall not be connected to an internal pipe in the boiler;

(6) No shutoff valve of any description shall be placed between the pressure relief valve and the boiler or on discharge pipes between such valves and the atmosphere;

(7) A discharge pipe shall be used. It shall be not less than the nominal size of the valve outlet. Where multiple valves relieve into a common discharge pipe, the cross-sectional flow area of the common discharge pipe shall be equal to or greater than the sum of the individual temperature and pressure relief

valve discharge pipe areas. Discharge pipes shall be securely anchored and supported, as short and straight as possible and arranged as to avoid undue stress on the valve or valves. A union may be installed in the discharge piping close to the valve outlet. When an elbow is placed on a pressure relief valve discharge pipe, it shall be located close to the valve outlet downstream of the union to minimize reaction moment stress;

(8) The discharge from pressure relief valves shall be so arranged that there will be no danger of scalding attendants. The pressure relief valve discharge shall be piped away from the boiler to a safe point of discharge, and there shall be provisions made for properly draining the piping. The size and arrangement of discharge piping shall be such that any pressure that may exist or develop will not reduce the relieving capacity of the relieving devices below that required to protect the boiler; and

(9) Hot-water heating or hot-water supply heating boilers limited to a water temperature of 210 degrees Fahrenheit may have one or more NB capacity certified temperature and pressure relief valve(s) installed. The requirements of paragraphs (1) through (8) shall be met, except as follows:

(A) A Y-type fitting shall not be used; and

(B) If additional valves are used, they shall be temperature and pressure relief valves, and when the temperature and pressure relief valve is installed directly on the boiler with no more than four (4) inches maximum interconnecting piping, the valve may be installed in the horizontal position with the outlet pointed down. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

12-223.1-11 Acceptable installation of temperature and pressure relief valves for potable water heaters. The following shall apply to the installation of temperature and pressure relief valves for potable water heaters:

(1) Temperature and pressure relief valves shall be installed by either the installer or the manufacturer before a water heater is placed in operation;

(2) Temperature and pressure relief valves shall be connected directly to a tapped or flanged opening in the top of the water heater, to a fitting connected to the water heater by a short nipple, to a Y-base, or to a valve-less header connecting water outlets on the same heater;

(3) Temperature and pressure relief valves shall be installed with their spindles upright and vertical with no horizontal connecting pipe, except that, when the temperature and pressure relief valve is installed directly on the water heater vessel with no more than four (4) inches maximum interconnecting piping, the valve may be installed in the horizontal position with the outlet pointed down. The center line of the temperature and pressure relief valve connection shall be no lower than four (4) inches from the top of the shell;

(4) No piping or fitting used to install the temperature and pressure relief valve shall be of nominal pipe size less than that of the valve inlet;

(5) When a potable water heater is fitted with two or more temperature and pressure relief valves on one connection, this connection shall have a cross-sectional area not less than the combined areas of inlet connections of all the temperature and pressure release valves with which it connects;

(6) When a Y-base is used, the inlet area shall be not less than the combined outlet areas;

(7) When the size of the water heater requires a temperature and pressure relief valve larger than NPS 4 two or more valves having the required combined capacity shall be used;

(8) When two or more valves are used on a water heater, they may be single, directly attached, or installed on a Y-base;

(9) A threaded connection may be used for attaching a temperature and pressure relief valve;

(10) Temperature and pressure relief valves shall not be connected to an internal pipe in the water heater or a cold-water feed line connected to the water heater;

(11) No shutoff valve of any description shall be placed between the temperature and pressure relief valve and the water heater or on discharge pipes between such valves and the atmosphere; and

(12) The discharge from temperature and pressure relief valves shall be so arranged that there will be no danger of scalding attendants. When the temperature and pressure relief valve discharge is piped away from the water heater to the point of discharge, there shall be provisions for properly draining the piping and valve body. The size and arrangement of discharge piping shall be such that any pressure that may exist or develop will not reduce the relieving capacity of the relieving devices below that required to protect the water heater. The following shall apply to discharge pipes:

(A) When a discharge pipe is used, it shall be not less than the nominal size of the valve outlet, and shall be as short and straight as possible, properly supported and so arranged as to avoid undue stress on the valve. When an elbow is placed on a temperature and pressure relief discharge pipe, it shall be located close to the valve outlet; and

(B) Where multiple valves relieve into a common discharge pipe, the cross-sectional flow area of the common discharge pipe shall be equal to or greater than the sum of the individual temperature and pressure relief valve discharge pipe areas. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§**12-223.1-12 Heating boiler room and operating area**. (a) The following shall apply to the care of heating boiler rooms:

(1) The heating boiler room shall be free from accumulation of rubbish, and materials that obstruct access to the boiler, its setting, or firing equipment;

(2) The storage of flammable material or gasoline-powered equipment in the heating boiler room is prohibited;

(3) The roof over heating boilers designed for indoor installations shall be free from leaks and maintained in good condition;

(4) All exit doors shall open outward; and

(5) It is recommended that the ASME BPVC Section VI, covering the care and operation of heating boilers be used as a guide for proper and safe operating practices.

(b) Foundation, supports, and settings. Each heating boiler and its associated piping must be safely supported. Design of supports, foundations, and settings shall consider vibration (including seismic where necessary), movement (including thermal expansion and contraction), and loadings (including the weight of the fluid in the system during a pressure test) in accordance with jurisdictional requirements, manufacturers recommendations, and other industry standards, as applicable.

(c) Exit. Two means of exit shall be provided for equipment rooms exceeding 500 square feet floor area

and containing one or more heating boilers having a combined fuel capacity of 1,000,000 Btu per hour or more. Each elevation shall be provided with at least two means of exit, each to be remotely located from the other. A platform at the top of a single heating boiler is not considered an elevation.

(d) The following shall apply to ladders and runways:

(1) All walkways, runways, and platforms shall be of metal construction or equivalent material;

(2) Provided between or over the top of heating boilers that are more than eight (8) feet above the operating floor to afford accessibility for normal operation, maintenance, and inspection;

(3) Constructed of safety treads, standard grating, or similar material and have a minimum width of thirty (30) inches of bolted, welded, or riveted construction, and equipped with handrails forty-two (42) inches high with an intermediate rail and four (4) inches toe board; and

(4) Stairways that serve as a means of access to walkways, runways, or platforms shall not exceed an angle of forty-five (45) degrees from the horizontal and be equipped with handrails forty-two (42) inches high with an intermediate rail.

(e) Drains. At least one floor drain shall be installed in the equipment room. Drains receiving blowdown water should be connected to the sanitary sewer by way of an acceptable blowdown tank or separator or an air gap that will allow the blowdown water to cool to at least 140 degrees Fahrenheit and reduce the pressure to five (5) psig or less.

(f) Water. The following shall apply to water:

(1) A means to add water to or fill the boiler, while not under pressure, shall be provided. A valve or threaded plug may be used to shut off the fill connection when the boiler is in service;

(2) Water fill connections shall be installed. A means shall be provided at or near the boiler to prevent back-feeding. Such means shall be rated for the boiler design pressure and temperature; and
(3) Provision should also be made in every equipment room for a convenient water supply that can be used to flush out the boiler and to clean the equipment room floor. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-223.1-13 Operating Systems. (a) Feedwater.
(1) Steam heating boilers. Feedwater or water treatment shall be introduced into a boiler through the return piping system. Alternatively, feedwater or water treatment shall be introduced through an independent connection. A cross or equivalent fitting shall be placed in the water piping connection at every right angle turn to facilitate cleaning and inspection. The water flow from the independent connection shall not discharge directly against parts of the boiler exposed to direct radiant heat from the fire. Feedwater or water treatment shall not be introduced through openings or connections provided for inspection or cleaning, safety valve, water column, water-gage glass, or pressure gage. The feedwater pipe shall be provided with a check valve, or a backflow preventer containing a check valve, near the boiler and a stop valve or cock between the check valve and the boiler, or between the check valve and the return pipe system;
(2) Hot-water heating boilers. Makeup water may be introduced into a boiler through the piping system or through an independent connection. The water flow from the

independent connection shall not discharge directly against parts of the boiler exposed to direct radiant heat from the fire. Makeup water shall not be introduced through openings or connections provided exclusively for inspection or cleaning, safety relief valve, pressure gage, or temperature gage. The makeup water pipe shall be provided with a check valve, or a backflow preventer containing a check valve, near the boiler and a stop valve or cock between the check valve and the boiler, or between the check valve and the piping system; and

(3) The following shall apply to potable water heaters:

(A) Water supply shall be introduced into a water heater through an independent water supply connection. Feedwater shall not be introduced through openings or connections provided for cleaning, safety relief valves, drain, pressure gage, or temperature gage; and

(B) If the water supply pressure to a water heater exceeds seventy-five per cent (75%) of the set pressure of the safety relief valve, a pressure reducing valve is required.

(b) Stop valves. Stop valves shall conform with the applicable portions of an acceptable code of construction and may be ferrous or nonferrous. The minimum pressure rating of all stop valves shall be at least equal to the pressure stamped upon the boiler, and the temperature rating of such stop valves shall be not less than 250 degrees Fahrenheit.

(1) The following shall apply to steam heating, hot-water heating, and hot-water supply boilers:

(A) When a stop valve is used in the supply pipe connection of a single steam boiler, there shall be one installed in the return pipe connection;

(B) Stop valves for single hot-water heating and hot-water supply heating boilers shall be located at an accessible point in the supply and return pipe connections as near to the boiler as possible, to permit draining the boiler without emptying the system; and

(C) Stop valves shall be used in each supply and-return pipe connection for boiler installations of two or more heating boilers connected to a common system; and

(2) Potable water heaters. Stop valves shall be installed in the supply and discharge pipe connections of a water heater installation to permit draining the water heater without emptying the system.

(c) Fuel. Fuel systems shall be installed in accordance with jurisdictional and environmental requirements, manufacturer's recommendations, and industry standards, as applicable.

(d) Electrical. The following shall apply to steam heating, hot-water heating, and hot-water supply boilers:

(1) All wiring for controls, heat generating apparatus, and other appurtenances necessary for the operation of the heating boilers shall be installed in accordance with the provisions of national or international standards and shall comply with the applicable local electrical codes;

(2) A disconnecting means capable of being locked in the open position shall be installed at an accessible location at the boiler so that the boiler can be disconnected from all sources of potential. This disconnecting means shall be an integral part of the boiler or adjacent to it;

(3) A manually operated remote shutdown switch or circuit breaker shall be located just outside the equipment room door and marked for easy identification. Consideration should also be

given to the type and location of the switch to safeguard against tampering;

(4) If the equipment room door is on the building exterior, the shutdown switch should be located just inside the door. If there is more than one door to the equipment room, there shall be a shutdown switch located at each door of egress;

(5) For atmospheric-gas burners, and oil burners where a fan is on a common shaft with the oil pump, the complete burner and controls should be shut off; and

(6) For power burners with detached auxiliaries, only the fuel input supply to the firebox need be shut off.

(e) Potable water heaters. The following shall apply to potable water heaters:

(1) All wiring for controls, heat generating apparatus, and other appurtenances necessary for the operation of the potable water heaters shall be installed in accordance with the provisions of national or international standards and comply with the applicable local electrical codes;

(2) A disconnecting means capable of being locked in the open position should be installed at an accessible location at the heater so that the heater can be disconnected from all sources of potential. This disconnecting means shall be an integral part of the heater or adjacent to it;

(3) For atmospheric-gas burners, and oil burners where a fan is on a common shaft with the oil pump, the complete burner and controls should be shut off; and

(4) For power burners with detached auxiliaries, only the fuel input supply needs be shut off.

(f) Controls and heat generating apparatus. The following shall apply to controls and heat generating apparatus:

(1) Oil and gas-fired and electrically heated heating boilers and water heaters shall be

equipped with suitable primary (flame safeguard) safety controls, safety limit controls, and burners or electric elements as required by a nationally or internationally recognized standard;

(2) The symbol of the certifying organization that has investigated such equipment as having complied with a nationally recognized standard shall be affixed to the equipment and shall be considered as evidence that the unit was manufactured in accordance with that standard; and

(3) These devices shall be installed in accordance with jurisdictional and environmental requirements, manufacturer's recommendations, and industry standards, as applicable.

(g) Ventilation and combustion air. The following shall apply to ventilation and combustion air:

(1) The equipment room shall have an adequate air to permit clean, safe combustion, minimize soot formation, and maintain a minimum of nineteen and a half per cent (19.5%) oxygen in the air of the equipment room and sufficient to maintain ambient temperatures as recommended by the boiler, heater, or vessel manufacturer. The combustion and ventilation air should be supplied by either an unobstructed air opening or by power ventilation or fans. When combustion air is supplied to the boiler by an independent duct, with or without the employment of power ventilators or fans, the duct shall be sized and installed in accordance with the manufacturer's recommendations. However, ventilation for the equipment room must still be considered;

(2) When combustion air is supplied to the boiler, heater, or vessel by an independent duct, with or without the employment of power ventilators or fans, the duct shall be sized and installed in accordance with the

manufacturer's recommendations. However, ventilation for the equipment room must still be considered;

(3) Unobstructed air openings shall be sized based on the manufacturer's recommendations, or as specified by the National Fire Protection Association (NFPA) standards for oil and gas burning installations for the particular job conditions, or one (1) square inch of free area per 2000 Btu per hour (586 W) maximum fuel input of the combined burners located in the equipment room. The equipment room supply openings shall be kept clear at all times;

(4) Power ventilators or fans shall be sized based on 0.2 cfm for each 1000 Btu per hour (293 W) of maximum fuel input for the combined burners of all heating boilers and heaters located in the equipment room. Additional capacity may be required for other fuel burning equipment in the equipment room;

(5) When power ventilators or fans are used to supply combustion air, they shall be installed with interlock devices so that burners will not operate without an adequate number of ventilators/fans in operation;

(6) When power ventilators or fans are used to supply combustion air, they shall be installed with interlock devices so that burners will not operate without an adequate number of ventilators/fans in operation;

(7) The size of openings specified in (3) may be reduced when special engineered air supply systems approved by the jurisdiction are used; and

(8) Care should be taken to ensure that steam, water and fluid lines are not routed across combustion air openings, where freezing may occur.

(h) Breeching and dampers. Breeching and dampers shall be installed in accordance with jurisdictional

and environmental requirements, manufacturer's recommendations, and industry standards, as applicable.

(i) Burners and stokers. Burners and stokers shall be installed in accordance with jurisdictional and environmental requirements, manufacturer's recommendations, and industry standards, as applicable.

(j) Lighting. The equipment room shall be well-lit and have an emergency light source for use in the case of a power failure.

(k) Emergency valves and controls. All emergency shut-off valves and controls shall be accessible from a floor, platform, walkway, or runway. Accessibility shall mean within a six (6) feet elevation of the standing space and not more than twelve (12) inches horizontally from the standing space edge.

(l) Chimney or stack. Chimneys or stacks shall be installed in accordance with jurisdictional and environmental requirements, manufacturer's recommendations, and industry standards, as applicable.

(m) Ash removal. Ash removal systems shall be installed in accordance with jurisdictional and environmental requirements, manufacturer's recommendations, and industry standards, as applicable.

(n) Return pipe connections. The following shall apply to return pipe connections:

(1) The return pipe connections of each boiler supplying a gravity return steam heating system shall be so arranged as to form a loop so that the water in each boiler cannot be forced out below the safe water level; and

(2) Provision shall be made for cleaning the interior of the return piping at or close to the boiler. Washout openings should be used for return pipe connections and the washout plug placed in a tee or a cross so that the plug is directly opposite and as close as possible to the opening in the boiler.

(o) Bottom blowoff and drain valves. The following shall apply to bottom blowoff and drain valves of steam heating, hot-water heating, and hot-water supply heating boilers:

(1) Each steam boiler shall have a bottom blowoff connection fitted with a valve or cock connected to the lowest water space practicable with a minimum size as shown in the NBIC. The discharge piping shall be full size to the point of discharge. Heating boilers having a capacity of twenty-five (25) gallons or less are exempt from the above requirements, except that they shall have a NPS three-fourths (3/4) minimum drain valve;

(2) Each steam or hot-water boiler shall have one or more drain connections, fitted with valves or cocks connecting to the lowest water containing spaces. All parts of the boiler must be capable of being drained (the boiler design will dictate the number and size of drains). The minimum size of the drain piping, valves, and cocks shall be NPS 3/4. The discharge piping shall be full size to the point of discharge. When the blowoff connection is located at the lowest water containing space, a separate drain connection is not required; and

(3) The minimum pressure rating of valves and cocks used for blowoff or drain purposes shall be at least equal to the pressure stamped on the boiler but in no case less than thirty (30) psig. The temperature rating of such valves and cocks shall not be less than 250 degrees Fahrenheit.

(p) Each potable water heater shall have a bottom drain pipe connection fitted with a valve or cock connected with the lowest water space practicable. The minimum size bottom valve shall be NPS three-fourths (3/4). Any discharge piping connected to the bottom drain connection shall be full size to the point of discharge.

(q) Provisions for thermal expansion of expansion tanks and piping for steam heating, hot-water heating, and hot-water supply heating boilers shall comply with the following:

(1) Expansion tanks for hot-water heating and hot-water supply heating boilers shall be installed so that all hot-water heating systems incorporating hot-water tanks or fluid relief columns prevent freezing under normal operating conditions;
(2) Heating systems with an open expansion tank shall have an indoor overflow from the upper portion of the expansion tank in addition to an open vent, the indoor overflow shall be carried within the building to a suitable plumbing fixture or drain;
(3) In closed heating systems an expansion tank shall be installed in a closed heating system that will be consistent with the volume and capacity of the system. If the system is designed for a working pressure of thirty (30) psig or less, the tank shall be suitably designed for a minimum hydrostatic test pressure of seventy-five (75) psig. Expansion tanks for systems designed to operate above thirty (30) psig shall be constructed in accordance with an acceptable code of construction. Provisions shall be made for draining the tank without emptying the system; and
(4) Hot-water supply systems. If a system is equipped with a check valve or pressure-reducing valve in the cold-water inlet line, consideration should be given to the installation of an airtight expansion tank or other suitable air cushion. Otherwise, due to the thermal expansion of the water, the safety relief valve may lift periodically. If an expansion tank is provided, it shall be constructed in accordance with an acceptable code of construction. Except for pre-pressurized tanks, which should be installed on the cold-water side, provisions shall be made for draining the tank without emptying the system.

(r) Piping for steam heating, hot-water heating, and hot-water supply boilers. Provisions shall be made for the expansion and contraction of steam and hot water mains connected to boiler(s) so there will be no undue strain transmitted to the boiler(s).

(s) Expansion tanks and piping for potable water heaters. The following shall apply to expansion tanks and piping for potable water heaters:

(1) If a system is equipped with a check valve or pressure-reducing valve in the cold-water inlet line, consideration should be given to the installation of an airtight expansion tank or other suitable air cushion. Otherwise, due to the thermal expansion of the water, the safety relief valve may lift periodically. If an expansion tank is provided, it shall be constructed in accordance with an acceptable code of construction. Except for pre-pressurized diaphragm-type tanks, which should be installed on the cold-water side, provisions shall be made for draining the tank without emptying the system; and

(2) Piping. Provisions shall be made for the expansion and contraction of hot water mains connected to potable water heater(s) so that there will be no undue stress transmitted to the potable water heater(s). [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-223.1-14 Preventive maintenance schedule. Maintenance. The owner or user of the pressure retaining item is responsible for ensuring that all equipment is maintained as listed in this section. Steam boiler maintenance shall be performed as per ASME BPVC Section VI, Steam Boiler – Sec 7.7 Maintenance, and ASME CSD-1, Part CM (see Exhibits 1 and 2). Hot-water boiler and hot-water heating boiler maintenance shall be performed as per ASME BPVC Section VI, Hot-

Water Boiler and Hot-Water Heating Boiler – Sec 8.7 Maintenance, and ASME CSD-1, Part CM (see Exhibits 1 and 2)." [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

RECOMMENDED PREVENTIVE MAINTENANCE SCHEDULE

(Operation and maintenance instructions in this safety standard are intended for general applications. For specific operating and maintenance instructions, consult the equipment manufacturer.)

D-1 DAILY

(a) Check gages, monitors, and indicators.
(b) Check instrument and equipment settings.
(c) For high-pressure boilers, test low-water fuel cut-off device and alarm.
(d) Check burner flame.

D-2 WEEKLY

(a) For low-pressure boilers, test low-water fuel cut-off device and alarm.
(b) Check igniter.
(c) Check flame signal strength.
(d) Check flame failure detection system.
(e) Check firing rate control.
(f) Make aural and visual check of pilot and main fuel valves.

D-3 MONTHLY

(a) Check flue, vent, stack, or outlet dampers.
(b) Test low draft, fan air pressure, and damper position interlocks.
(c) Check low-fire start interlock.
(d) Test high and low oil pressure and temperature interlocks.
(e) Test high and low gas pressure interlocks.

D-4 SEMI-ANNUALLY

(a) Recalibrate all indicating and recording gages.
(b) For steam boilers, perform a slow drain test of the low-water fuel cut-off device.
(c) Check flame failure detection system components.
(d) Check firing rate control.
(e) Check piping and wiring of all interlocks and shut-off valves.
(f) Inspect burner components.

D-5 ANNUALLY

(a) Flame failure detection system, pilot turndown test.
(b) Flame failure detection system, test for hot refractory hold in.
(c) Check dual fuel change over control.
(d) Test high-limit and operating temperature or steam pressure controls.
(e) Replace vacuum tubes, scanners, or flame rods in accordance with manufacturer's instructions.
(f) Conduct a combustion test.
(g) Check all coils and diaphragms; test other operating parts of all safety shutoff and control valves.
(h) Test fuel valve interlock switch in accordance with manufacturer's instructions.
(i) Perform leakage test on pilot and main gas and/or oil fuel valves.
(j) Test purge air switch in accordance with manufacturer's instructions.
(k) Test air/steam interlock in accordance with manufacturer's instructions.
(l) Test burner position interlock in accordance with manufacturer's instructions.
(m) Test rotary cup interlock in accordance with manufacturer's instructions.
(n) Test low-fire start interlock in accordance with manufacturer's instructions.

D-6 AS REQUIRED

(a) Recondition or replace low-water fuel cut-off device.
(b) For oil-fired burners, clean atomizers and oil strainers.
(c) For gas-fired burners, check sediment trap and gas strainers.
(d) Flame failure detection system, pilot turndown test.
(e) Flame failure detection system, test for hot refractory hold in.
(f) Test safety/safety relief valves in accordance with ASME Boiler and Pressure Vessel Code, Sections VI and VII.

Table D-1 Periodic Testing Recommended Checklist (See Manufacturer's Instructions)

Frequency [Note (1)]								Accomplished By	
D	W	M	S/A	A	A/R	Component/Item	Recommended Test	Boiler Operator	Service Technician
X	...	...	...	...	...	Gages, monitors, and indicators	Make visual inspection and record readings in boiler log.	X	...
...	...	...	X	...	...	Gages, monitors, and indicators	Recalibrate all indicating and recording gages.	...	X
X	...	...	...	...	...	Instrument and equipment settings	Make visual check against factory-recommended specifications.	X	...
X	...	...	...	...	...	Low-water fuel cut-off device (high-pressure boilers)	Test low-water fuel cut-off device according to manufacturer's instructions.	X	...
...	X	...	...	...	...	Low-water fuel cut-off device (low-pressure boilers)	Test low-water fuel cut-off device according to manufacturer's instructions.	X	...
...	...	...	X	...	...	Low-water fuel cut-off device (steam boilers)	For steam boilers, perform a slow drain test in accordance with ASME Boiler and Pressure Vessel Code, Section VI.	...	X
...	...	...	...	...	X	Low-water fuel cut-off device	Recondition or replace low-water fuel cut-off device.	...	X
...	...	...	...	X	...	Operating and/or limit controls	Test high-limit and operating temperature or steam pressure controls.	...	X
...	...	...	...	...	X	Safety/safety relief valves	Test safety/safety relief valves in accordance with ASME Boiler and Pressure Vessel Code, Sections VI and VII.	...	X
...	...	X	...	...	...	Flue, vent, stack, or outlet dampers	Make visual inspection of linkage, and check for proper operation.	X	...
X	...	...	...	...	...	Burner flame	Make visual inspection of burner flame [Note (2)].	X	...
...	X	...	...	...	...	Igniter	Make visual inspection, and check flame signal strength if meter-fitted.	X	...
...	X	...	...	...	...	Flame signal strength	If flame signal meter is installed, read and log. For both pilot and main flames, notify service organization if readings are very high, very low, or fluctuating (refer to manufacturer's instructions).	X	...
...	X	...	...	...	...	Flame failure detection system	Close manual fuel supply for (1) pilot, (2) main fuel cock, and/or (3) valve(s). Check safety shutdown timing, and log.	X	...

Table D-1 Periodic Testing Recommended Checklist (Cont'd)

Frequency [Note (1)]								Accomplished By	
D	W	M	S/A	A	A/R	Component/Item	Recommended Test	Boiler Operator	Service Technician
...	...	...	X	...	...	Flame failure detection system	Check flame failure detection system components, such as vacuum tubes, amplifier, and relays.	...	X
...	...	...	...	X	...	Flame failure detection system	Replace vacuum tubes, scanners, or flame rods in accordance with manufacturer's instructions.	...	X
...	...	...	...	X	X	Flame failure detection system (pilot turndown test)	Conduct pilot turndown test according to manufacturer's instructions. This test is required annually and after any adjustments to flame scanner mount or pilot burner.	...	X
...	...	...	...	X	X	Flame failure detection system (hot refractory hold in test)	Test for hot refractory hold in. This test is required annually and after any adjustments to the flame scanner mount or pilot burner.	...	X
...	X	...	...	...	...	Firing rate control	Check firing rate control, and verify factory settings (refer to manufacturer's instructions).	X	...
...	...	...	X	...	...	Firing rate control	Check firing rate control, and verify factory settings (refer to manufacturer's instructions).	...	X
...	...	...	...	X	...	Firing rate control	Conduct a combustion test, and verify settings are in accordance with manufacturer's instructions.	...	X
...	X	...	...	...	...	Pilot and/or main fuel valves	Open limit switch, and make aural and visual check. Check valve position indicators, and check fuel meters if so fitted.	X	...
...	...	...	...	X	...	Pilot and/or main fuel valves	Check all coils and diaphragms. Test other operating parts of all safety shutoff and control valves.	...	X
...	...	...	...	X	...	Pilot and/or main fuel valves	Test fuel valve interlock switch in accordance with manufacturer's instructions.	...	X
...	...	...	...	X	...	Pilot and/or main fuel valves	Perform leakage test on pilot and main gas and/or oil fuel valves, in accordance with manufacturer's instructions.	...	X
...	...	X	...	...	...	Low draft, fan, air pressure, and damper position interlocks	Test low draft, fan, air pressure, and damper position interlocks according to manufacturer's instructions.	X	...
...	...	...	...	X	...	Low draft, fan, air pressure, and damper position interlocks	Test purge switch in accordance with manufacturer's instructions.	...	X

EXHIBIT 2 Continued

Table D-1 Periodic Testing Recommended Checklist (Cont'd)

Frequency [Note (1)]								Accomplished By	
D	W	M	S/A	A	A/R	Component/Item	Recommended Test	Boiler Operator	Service Technician
...	...	X	...	...	...	Low-fire start interlock	Check low-fire start interlock according to manufacturer's instructions.	X	...
...	...	...	...	X	...	Low-fire start interlock	Test low-fire start interlock in accordance with manufacturer's instructions.	...	X
...	...	X	...	...	...	Oil pressure and temperature interlocks	Test high and low oil pressure and temperature interlocks according to manufacturer's instructions.	X	...
...	...	X	...	...	...	Gas pressure interlocks	Test high and low gas pressure interlocks according to manufacturer's instructions.	X	...
...	...	...	X	...	...	Interlocks and valves	Check piping and wiring of all interlocks, and shutoff valves.	...	X
...	...	...	...	X	...	Atomizing air/steam interlock	Test air/steam interlock in accordance with manufacturer's instructions.	...	X
...	...	...	...	X	...	Burner position interlock	Test burner position interlock in accordance with manufacturer's instructions.	...	X
...	...	...	...	X	...	Rotary cup burner interlock	Test rotary cup interlock in accordance with manufacturer's instructions.	...	X
...	...	...	X	...	...	Burner components	Inspect burner components according to manufacturer's instructions.	...	X
...	...	...	...	X	X	Burner components	Check dual fuel change over control. If automatically controlled by gas utility, perform test under the supervision of gas utility.	...	X
...	...	...	...	...	X	Burner components	For oil-fired burners, clean atomizers and oil strainers.	...	X
...	...	...	...	...	X	Burner components	For gas-fired burners, check sediment trap and gas strainer.	...	X

NOTES:
(1) D, daily; W, weekly; M, monthly; S/A, semi-annually; A, annually; A/R, as-required.
(2) Caution should be used when viewing burner flame. Personal protective equipment, such as filtered eyeware, may be necessary.

BOILER INSTALLATION REPORT I-1

INSTALLATION: (1) ☐ New ☐ Reinstalled ☐ Second Hand Date ____/____/____

(2) INSTALLER	(3) OWNER-USER	(4) OBJECT LOCATION
Name	Name	Name
Street	Street, PO Box, RR	Street
City, State, ZIP	City, State, ZIP	City, State, ZIP

Jurisdiction No. (5)	National Board No. (6)	Manufacturer (7)	Mfg. Serial No. (8)	Year Built (9)	Boiler Type (10)	Boiler Use (11)

Fuel (12)	Method of Firing (13)	Btu/hr input (14)	Btu/hr output (15)	Operating PSI (16)	Code Stamp(s) (17)	
					☐A ☐S ☐U ☐HLW ☐M ☐R ☐H ☐Other	

Stamped MAWP (18)	Heating Surface, Sq. Ft. (19)	Cast Iron (20)	Manhole (21)	Specific On-Site Location, i.e., Utility Room (22)

Pressure Relief Valve Size (23)	Pressure Relief Valve Set Pressure (24)	Pressure Relief Valve Capacity ☐BTU/hr ☐Lb/hr (25)	Manufacturer (26)	Low-Water Fuel Cutoff Mfg. (27) No.
1.	1.	1.	1.	Probe Type
2.	2.	2.	2.	Flow Switch
3.	3.	3.	3.	Float & Chamber
4.	4.	4.	4.	Other (Specify)

PRESSURE/ALTITUDE GAGE (28)	EXPANSION TANK (29)	VENTILATION AND COMBUSTION AIR (30)
Dial Graduation	ASME Constructed ☐Yes ☐No	
Valve/Cock Size MAWP	Other	Unobstructed Opening (sq. in.)
Pipe Connection Size	MAWP	Power Ventilator Fan (CFM)
Siphon or Equivalent Device ☐Yes ☐No	No. Gallons	

WATER LEVEL INDICATORS: (31)	FEEDWATER SUPPLY: (32)
Number of Gage Glasses	Number of Feeding Means
Number of Remote Indicators	Pipe Size
Size of Connection Piping	Stop Valve Size MAWP
	Check Valve Size MAWP

STOP VALVES: (33)	EXTERNAL PIPING ASME CODE:	FUEL TRAIN:
Number of Valves	☐Yes ☐No (40)	☐CSD-1 ☐NFPA-85
Valve Size	☐Other	☐Other

BOTTOM BLOWDOWN CONNECTIONS: (39)	POTABLE WATER HEATER UNIQUE REQUIREMENTS ☐Yes ☐No
Number of Valves	Inlet Stop Valve Size MAWP
Valve Size MAWP	Outlet Stop Valve Size MAWP
Piping Run Full Size ☐Yes ☐No	Drain Valve Size (34)
	Thermometer ☐Yes

Manufacturer's Certification Attached: ☐Yes ☐No (35)	Clearance from walls and floors:
Does boiler replace existing one: ☐Yes ☐No (36)	Side Bottom Top (35)

Additional recommendations and remarks by installer:

(37)

(38)		I HEREBY CERTIFY THAT THE INSTALLATION COMPLIES WITH APPENDIX I
Installer Name (PRINT)	Registration #	(58) Installer Signature

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Ave., Columbus, OH 43229 NB-365 Rev. 2

NONMANDATORY 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 not part of ASME CSD-1–2012.)

Unit Manufacturer

Name _____

Address _____ Zip _____

Telephone _____ Fax _____

Unit Identification (Boiler)

Manufacturer's Model # _____ Year Built _____

ASME Section I _____ Section IV _____ Nat. Bd. # _____

UL # _____ CSA # _____

Jurisdiction _____

Steam

Maximum W.P. _____ psig

Minimum Safety Valve Cap. _____ PPH

Hot Water

Maximum W.P. _____ psig

Maximum Temp. _____ °F

Minimum 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 CSA # _____ Serial # _____

Fuels (as shipped) _____

	Indicate Units (where not applicable, indicate "N/A")
Gas Manifold Pressure	
Oil Nozzle/Delivery Pressure (at maximum input)	
High Gas Pressure Switch Setting	
Low Oil Pressure Switch Setting	

Installation Location (if known)

Customer Name _____

Address _____

City _____ State _____ Zip _____

Telephone _____ Fax _____

Certification and Reporting (CG-500) for Controls and Safety Devices (Cont'd)

(This Form is a guideline and not part of ASME CSD-1–2012.)

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			
Flame Detector CF-310, CF-320			
Low Fire Start			
Low-Fire Start Switch CF-610			
Safety or Safety Relief Valve(s) CW-510, CW-520			

EXHIBIT 5 Continued

Certification and Reporting (CG-500) for Controls and Safety Devices (Cont'd)

(This Form is a guideline and not part of ASME CSD-1–2012.)

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

Model _____

Size _____

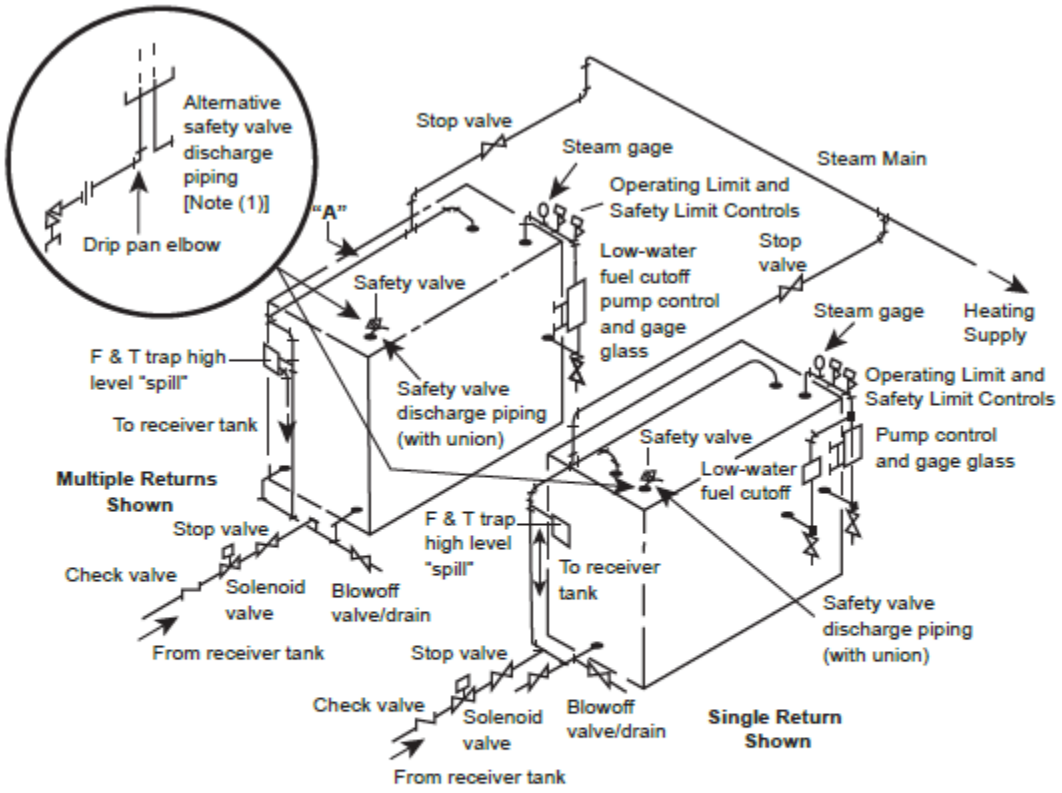
Capacity _____ PPH/Btu/hr

Representing Equipment Manufacturer, Name _____

Signature _____ Date _____

Representing Installing Contractor, Name _____

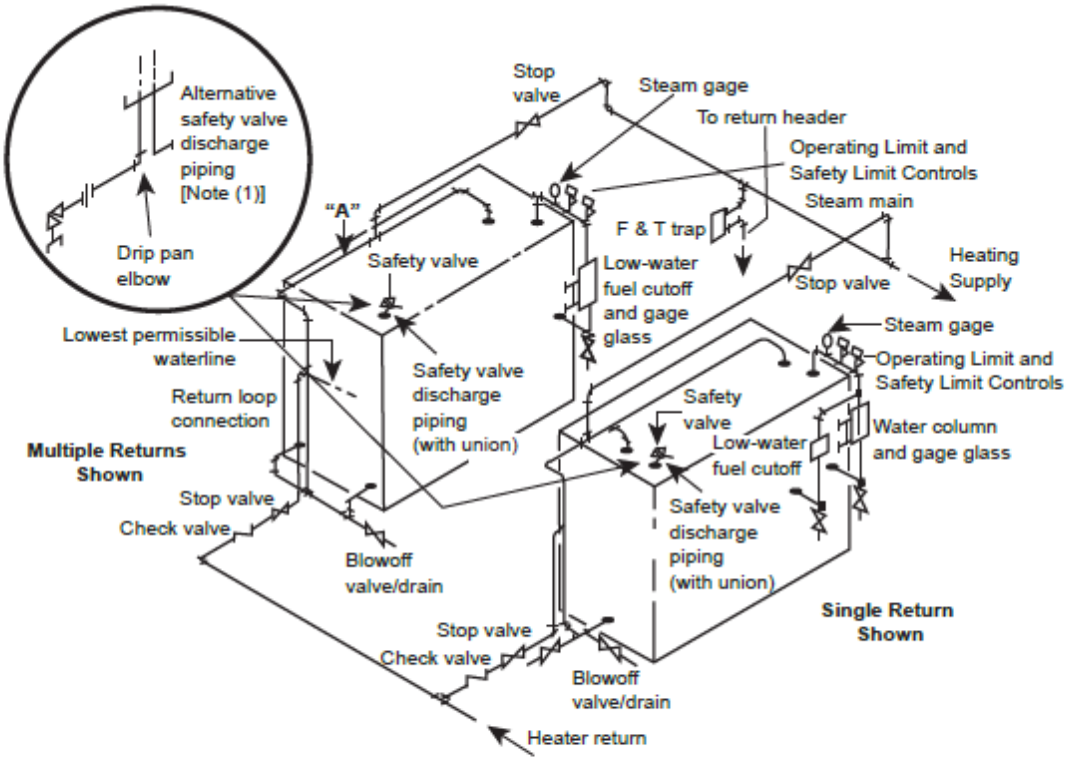
Signature _____ Date _____



General Note:
Return connections shown for multiple boiler installation may not always ensure that the system will operate properly. In order to maintain proper water levels in multiple boiler installations, it may be necessary to install supplementary controls or suitable devices.

Note:
(1) Recommended for 1 in. (25mm) and larger safety valve discharge.

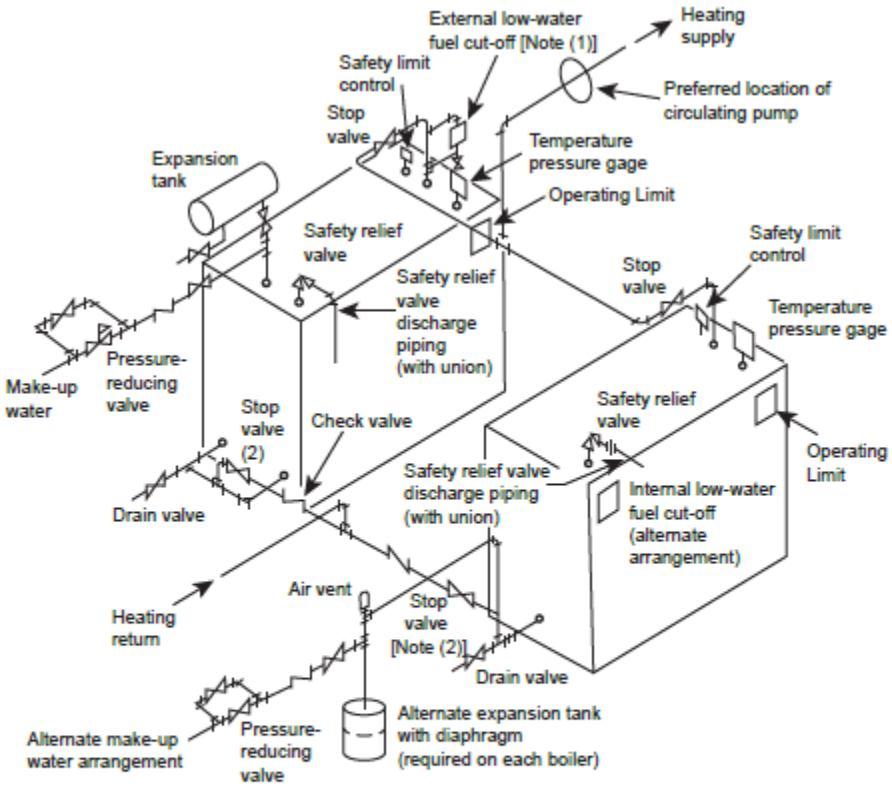
EXHIBIT 7 September 1, 2019



General Note:
Return connections shown for multiple boiler installation may not always ensure that the system will operate properly. In order to maintain proper water levels in multiple boiler installations, it may be necessary to install supplementary controls or suitable devices.

Note:
(1) Recommended for 1 in. (25mm) and larger safety valve discharge.

EXHIBIT 8 September 1, 2019



General Notes:

(1) Recommended control. See ASME Section IV, HG-614. Acceptable shutoff valve or cocks in the connecting piping may be installed for convenience or control testing and/or service.

(2) The common return header stop valves may be located on either side of the check valves.

EXPANSION TANK CAPACITIES FOR GRAVITY HOT-WATER SYSTEMS

Based on two-pipe system with average operating water temperature 170°F (77°C), using cast-iron column radiation with heat emission rate 150 Btu/hr/ft² (473 W/m²) equivalent direct radiation.		
Installed Equivalent Direct Radiation, ft² (m²) (Note)	**No.**	**Tank Capacity, gallon (*l*)**
up to 350 (33)	1	18 (68)
up to 450 (42)	1	21 (79)
up to 650 (60)	1	24 (91)
up to 900 (84)	1	30 (114)
up to 1,100 (102)	1	35 (132)
up to 1,400 (130)	1	40 (151)
up to 1.600 (149)	2	60 (227)
up to 1,800 (167)	2	60 (227)
up to 2,000 (186)	2	70 (265)
up to 2,400 (223)	2	80 (303)

Note:

For systems with more than 2,400 ft² (223 m²) of installed equivalent direct water radiation, the required capacity of the cushion tank shall be increased on the basis of 1 gallon (3.79 l) tank capacity/33 ft² (3.1 m²) of additional equivalent direct radiation.

MINIMUM POUNDS OF STEAM PER HOUR PER SQUARE FOOT OF HEATING SURFACE
lb steam/hr ft² (kg steam/hr m²)

	Firetube Boiler	Watertube Boiler
Boiler Heating Surface		
Hand-fired	5 (24)	6 (29)
Stoker-fired	7 (34)	8 (39)
Oil, gas, or pulverized coal	8 (39)	10 (49)
Waterwall Heating Surface		
Hand-fired	8 (39)	8 (39)
Stoker-fired	10 (49)	12 (59)
Oil, gas, or pulverized coal	14 (68)	16 (78)
Copper-finned Watertubes		
Hand-fired		4 (20)
Stoker-fired		5 (24)
Oil, gas, or pulverized coal		6 (29)

Notes:

- When a boiler is fired only by a gas having a heat value not in excess of 200 Btu/ft.^{3}(7.5MJ/m^3), the minimum relieving capacity should be based on the values given for hand-fired boilers above.
- The heating surface shall be computed for that side of the boiler surface exposed to the products of combustion, exclusive of the superheating surface. In computing the heating surface for this purpose only the tubes, fireboxes, shells, tubesheets, and the projected area of headers need to be considered, except that for vertical firetube steam boilers, only that portion of the tube surface up to the middle gage cock is to be computed.
- For firetube boiler units exceeding 8,000 Btu/ft.^{2} (9,085 J/cm.^{2}) (total fuel Btu (J) Input divided by total heating surface), the factor from the table will be increased by 1 (4.88) for every 1,000 Btu/ft.^{2} (1,136 J/cm.^{2}) above 8,000 Btu/ft.^{2} (9,085 J/cm.^{2}) For units less than 7,000 Btu/ft.^{2} (7,950 J/cm.^{2}), the factor from the table will be decreased by 1 (4.88).
- For watertube boiler units exceeding 16,000 Btu/ft.^{2} (18,170 J/cm.^{2})(total fuel Btu input divided by the total heating surface) the factor from the table will be increased by 1 (4.88) for every 1,000 Btu/ft.^{2} (1,136 J/cm.^{2}) above 16,000 Btu/ft.^{2} (18,170 J/cm.^{2}). For units with less than 15,000 Btu/ft.^{2} (17,034 J/cm.^{2}), the factor in the table will be decreased by 1 (4.88) for every 1,000 Btu/ft.^{2} (1,136 J/cm.^{2}) below 15,000 Btu/ft.^{2} (17,034 J/cm.^{2}).

8. Chapter 12-224, Hawaii Administrative Rules, entitled "Pressure Vessels", is repealed:

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILER AND PRESSURE VESSELS

CHAPTER 224

PRESSURE VESSELS

Historical Note: Chapter 224 of title 12 is based on chapter 377 of the Hawaii Occupational Safety and Health Standards, Rules and Regulations. [Eff 7/11/74; am 12/30/76; am 8/1/78; R 12/6/82]

[~~**§12-224-1 Maximum allowable working pressure for standard pressure vessels**. The maximum allowable working pressure for standard pressure vessels shall be determined in accordance with the applicable provisions of the edition of the ASME Code under which they were constructed and stamped. Pressure vessels constructed to the Canadian Standard CSA B51 shall be registered with the National Board.~~] [Eff 12/6/82; comp 12/6/90; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-224-2 Maximum allowable working pressure nonstandard pressure vessels**. The maximum allowable working pressure of a nonstandard pressure vessel shall be determined by the strength of the weakest course computed from the thickness of the plate, and the efficiency of the longitudinal joint, using the lowest stress values for the applicable material from Section Vill, Division ASME Code.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-224-3 Overpressure protection**. (a) All pressure vessels within the scope of this chapter irrespective of size or pressure shall be provided with protective devices in accordance with the ASME Code, Section VIII. When relief valves, safety valves,~~

~~or safety-relief valves are used, they shall comply with section 12-221-6.~~

~~(b) All Pressure Vessels for Human Occupancy shall have an isolation valve mounted between the safety valve and the vessel it serves per ASME PVHO 1.~~] [Eff 12/6/82; am and comp 12/6/90; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-224-4 Pressure gage~~**. ~~Each pressure vessel, or system of pressure vessels with no intervening valves, shall be equipped with a pressure gage graduated to not less than 1-1/2 times nor more than 3 times the pressure at which the safety or safety-relief valve is set.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-224-5 Repairs and renewals of fittings and appliances~~**. ~~Whenever repairs are made to fittings and appliances or it becomes necessary to replace them, the work must comply with the requirements for new installations.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-224-6 Clearances~~**. ~~Except as otherwise authorized by the department, clearances for pressure vessels shall not be less than 3 feet where inspection openings are provided. Vessels having manholes shall, have 5 feet clearance from the manhole opening and any wall, ceiling, or piping that will prevent a person from entering. All other sides shall not be less than 18 inches between the vessel and adjacent walls or other structures. Under no circumstances shall an air receiver be buried underground or located in an~~

~~inaccessible place.~~] [Eff 12/6/82; am 12/8/86; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-224-7 Drains and traps~~**. ~~A drain pipe and valve shall be installed at the lowest point of every pressure vessel subject to internal corrosion to provide for draining or the removal of accumulated oil and water from an air receiver. Adequate automatic traps may be installed in addition to drain valves. The drain valve on an air receiver shall be opened and the receiver completely drained frequently and at such intervals as to prevent the accumulation of excessive amounts of liquids in the receiver.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-224-8 Use of thermoplastic piping~~**. ~~The use of thermoplastic piping, known as PVC piping, to transport compressed air or other compressed gases, or the testing of this piping with compressed air or other compressed gases, in exposed above ground locations is prohibited. All thermoplastic piping used to transport compressed air or other compressed gases shall be buried underground or encased in shatter-resistant materials. In designing thermoplastic piping systems to transport compressed air or other compressed gases, the strength at the operating temperature, the pressure, the energetics, and specific failure mechanisms shall be evaluated.~~] [Eff 12/6/82; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-224-9 Beltguards~~**. ~~Beltguards shall be installed on air compressor units.~~] [Eff 12/19/83; comp 12/6/90; R] (Auth: HRS

§397-4) (Imp: HRS §397-4)

[~~**§12-224.10 Thermometer**. Pressure vessels used for the containment of heated liquid shall be provided with a thermometer in addition to the pressure gage required in section 12-224-4. For pressure vessels having more than one temperature zone, the location of the thermometer shall be determined by the inspector.~~] [Eff 12/19/83; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[~~**§12-224-11 Isolating valves**. Each pressure vessel or multiple pressure vessels connected in series shall have isolating valves which isolate the vessel or vessels from the system in which it or they are installed.~~]" Eff 12/19/83; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

9. Chapter 12-224.1, Hawaii Administrative Rules, entitled "Pressure Vessels", is adopted to read as follows:

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILER AND PRESSURE VESSELS

CHAPTER 224.1

PRESSURE VESSELS

Historical Note: This chapter is based substantially upon chapter 224. [Eff 12/6/82; am 12/19/83; am 12/8/86; am and comp 12/6/90; am 11/18/12
R]

§12-224.1-1 Scope. The requirements in this section shall apply to pressure vessels, except for the exemptions in section 12-220-2.1 (c)(3) and (4), and is not limited to the following:

(1) All unfired pressure vessels with design pressure exceeding fifteen (15) psi or five (5) cubic feet in volume;
(2) Hot water storage tanks with a nominal water containing capacity greater than 120 gallons;
(3) Unfired autoclaves greater than five (5) cubic feet in volume regardless of operating pressure;
(4) Fired or self-contained sterilizers, jacketed kettles, steam cookers, and autoclaves exceeding a heat input of three (3.0) kw or a volume of one and a half (1.5) cubic feet;
(5) Unfired jacketed kettles with a cooking capacity of forty (40) gallons or more;
(6) Heat exchangers with a heat input exceeding 200,000 Btu/H or five (5) cubic feet in volume;
(7) Hydro pneumatic tanks exceeding one hundred twenty 120 gallons in volume;
(8) Expansion tanks exceeding five (5) cubic feet in volume for hot water heating system; and
(9) Pressure Vessels for Human Occupancy (PVHOs). [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-224.1-2 General requirements. (a) All pressure vessels in operation in this jurisdiction shall have a current and valid operating permit issued to a specific location by the department. Changes in ownership shall require notifying the department and may require reinspection.

(b) All pressure vessels shall bear the ASME Code Symbol Stamp "HLW", "U", "U2", "U3", "RP" or ASME

certification mark with the appropriate designator and the NB registration number. The ASME/NB stamping shall be legible, and insulation and paint shall not conceal the stamping.

(c) Upon completion of the installation of a new pressure vessel, it shall be marked by an inspector employed by the department with a state serial number, consisting of letters and figures not less than 5/16 inch in height and arranged as HPV####-Year.

(d) Replacement of an existing pressure vessel shall be in accordance with the requirements for new installations. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-224.1-3 Responsibilities of owners and users. (a) The owner or user of the pressure vessel is responsible for ensuring that all equipment meet the requirements of the jurisdiction at the point of installation including licensing, registration, and certification of those performing installations.

(b) Owners or users shall ensure operating permit renewal inspections are completed prior to the permit expiration date. It is the responsibility of the owner or user to schedule pressure vessel permit renewal inspections.

(c) Operation of pressure vessels with expired operating permits is not allowed and may be subject to penalties as described in this part. Requests for the extension of operating permits may be considered for valid reasons by submitting a written request to the chief boiler inspector. The unavailability of special inspectors to conduct inspections is not a valid reason for requesting permit extensions; inspectors employed by the department may perform the inspections in the absence of special inspectors. [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-224.1-4 Inspections. (a) Initial acceptance inspections shall be conducted and witnessed by the chief boiler inspector or deputy inspector designee. These inspections may include internal inspection where construction permits, post installation pressure test at the inspector's discretion, and operational testing of controls and safety devices by the installer, contractor, or owner. Tests shall be made in conformance with the procedures set forth in ASME BPVC, NBIC, and this part.

(b) Permit renewal inspections. Pressure vessels shall receive a permit renewal inspection every two years. Pressure vessels that are under the ownership, inspection, and supervision of an OUIO may be inspected on a different inspection frequency upon approval by the chief boiler inspector.

(c) Additional inspection requirements include the following:

(1) Internal inspections, where construction permits and hydrostatic testing, which may be required at the inspector's discretion, shall occur when deemed necessary for continued safe operation of the pressure vessel;

(2) The owner shall develop safety policies and procedures for entering pressure vessels and confined spaces; and

(3) Pressure vessels used for the treatment of wood shall be scrubbed clean for close visual inspection every ten years.

[Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

§12-224.1-5 Technical installation requirements. (a) All pressure vessels shall be installed as required in section 12-220-2.1 and this chapter. An application for installation permit shall be submitted to the department prior to the commencement of work. Pressure vessels installed without an installation

permit may be subject to citations with penalties up to $10,000 per day pursuant to section 12-220-22.

(b) First acceptance inspection and certification. The following shall apply to first acceptance inspections and certifications:

(1) Upon completion of the installation, the contractor or owner shall arrange for acceptance inspection with the department;

(2) The installing contractor shall operationally test the pressure vessel controls and safety devices prior to scheduling first acceptance inspection with the department;

(3) The chief boiler inspector or designated deputy inspector shall conduct the first data inspection, acceptance inspection, and apply the required state pressure vessel identification marking; and

(4) The installing contractor shall test the pressure vessel as directed and witnessed by the chief boiler inspector or designated deputy inspector.

(c) Clearances. All pressure vessel installations must allow sufficient clearance for normal operation, maintenance, and inspection (internal and external). Except as otherwise authorized by the department, clearances for pressure vessels shall not be less than three (3) feet where inspection openings are provided. Vessels having manholes shall have five (5) feet clearance from the manhole opening and any wall, ceiling, or piping that may prevent a person from entering. All other sides shall not be less than eighteen (18) inches between the vessel and adjacent walls or other structures. Alternative clearances in accordance with the manufacturer's recommendations are subject to acceptance by the department.

(d) Pressure relief devices. All pressure vessels shall be protected by pressure relief devices in accordance with the following requirements:

(1) Device requirements:

(A) Each pressure vessel shall be provided with pressure relief devices, to protect against overpressure. These pressure relief devices shall bear the National Board "NB" symbols, the ASME certification mark, and the appropriate designator, as required by the ASME BPVC;

(B) Deadweight or weighted lever pressure relief valves shall not be used;

(C) An unfired steam boiler shall be equipped with pressure relief valves as required in NBIC Part 1, 2.9;

(D) Pressure relief devices shall be selected (e.g., material, pressure, etc.) and installed such that their proper functioning will not be hindered by the nature of the vessel's contents; and

(E) Relief valves, safety valves, or safety relief valves shall be of the hand lift lever type whenever possible to facilitate actuating and testing the device for free operation;

(2) Number of devices. At least one device shall be provided for protection of a pressure vessel. Pressure vessels with multiple chambers with different maximum allowable working pressures shall have a pressure relief device to protect each chamber under the most severe coincident conditions;

(3) Location. The following shall apply to location of devices:

(A) The pressure relief device shall be installed directly on the pressure vessel, unless the source of pressure is external to the vessel and is under such positive control that the pressure cannot exceed the maximum overpressure permitted by the original code of construction and the pressure relief device cannot be isolated from the

vessel, except as permitted by NBIC Part 1, 4.5.6(e)(2);

(B) Pressure relief devices intended for use in compressible fluid service shall be connected to the vessel in the vapor space above any contained liquid or in the piping system connected to the vapor space; and

(C) Pressure relief devices intended for use in liquid service shall be connected below the normal liquid line. The liquid level during upset conditions shall be considered;

(4) Capacity. The following shall apply to the capacity of pressure relief devices:

(A) The pressure relief device(s) shall have sufficient capacity to ensure that the pressure vessel is not exposed to pressure greater than that specified in the original code of construction;

(B) Vessels connected by a system of piping not containing valves that can isolate any pressure vessel shall be considered as one unit when determining capacity requirements;

(C) Heat exchangers and similar vessels shall be protected with a pressure relief device of sufficient capacity to avoid overpressure in case of internal failure; and

(D) The owner shall make information regarding the basis of pressure relief device selection, including required capacity, available to the jurisdiction;

(5) Set pressure. The following shall apply to the set pressure of pressure relief devices:

(A) When a single pressure relief device is used, the set pressure marked on the device shall not exceed the maximum allowable working pressure; and

(B) When more than one pressure relief device is provided to obtain the required capacity, only one pressure relief device set pressure needs to be at the maximum allowable working pressure. The set pressures of the additional pressure relief devices shall be such that the pressure cannot exceed the overpressure permitted by the code of construction; and

(6) Installation and discharge piping requirements. The following shall apply to the installation and discharge piping of pressure relief devices:

(A) The opening through all pipe and fittings between a pressure vessel and its pressure relief device shall have at least the area of the pressure relief device inlet. The characteristics of this upstream system shall be such that the pressure drop will not reduce the relieving capacity below that required or adversely affect the proper operation of the pressure relief device. When a discharge pipe is used, the size shall be such that any pressure that may exist or develop will not reduce the relieving capacity below that required or adversely affect the proper operation of the pressure relief device. It shall be as short and straight as possible and arranged to avoid undue stress on the pressure relief device;

(B) The opening in the pressure vessel wall shall be designed to provide unobstructed flow between the vessel and its pressure relief device;

(C) When two or more required pressure relief devices are placed on one connection, the inlet cross-sectional area of this connection shall be sized

either to avoid restricting flow to the pressure relief devices or made at least equal to the combined inlet areas of the pressure relief devices connected to it. The flow characteristics of the upstream system shall satisfy the requirements of NBIC Part 1, 4.5.6(e); and

(D) There shall be no intervening stop valves between the vessel and its pressure relief device(s), or between the pressure relief device(s) and the point of discharge, except under the following conditions:

(i) When these stop valves are so constructed or positively controlled that the closing of the maximum number of block valves at one time will not reduce the pressure relieving capacity below the required relieving capacity;

(ii) Upon specific acceptance of the jurisdiction, when necessary for the continuous operation of processing equipment of such a complex nature that shutdown of any part is not feasible, a full area stop valve between a pressure vessel and its pressure relief device shall be provided for inspection and repair purposes only. This stop valve shall be arranged so that it can be locked or sealed open, and it shall not be closed except by an authorized person who shall remain stationed there during that period of operation while the valve remains closed. The valve shall be locked or sealed in the open position before the authorized person leaves the station;

(iii) A full area stop valve shall also be placed on the discharge side of a pressure relief device when its discharge is connected to a common header for pressure relief devices to prevent discharges from these other devices from flowing back to the first device during inspection and repair. This stop valve shall be arranged so that it can be locked or sealed open, and it shall not be closed except by an authorized person who shall remain stationed there during that period of operation while the valve remains closed. The valve shall be locked and sealed in the open position before the authorized person leaves the station. This valve shall only be used when a stop valve on the inlet side of the pressure relief device is first closed;

(iv) A pressure vessel in a system where the pressure originates from an outside source shall have a stop valve between the vessel and the pressure relief device, and this valve need not be sealed open, provided it also closes off that vessel from the source of the pressure;

(v) Pressure relief device discharges shall be arranged such that they are not a hazard to personnel or other equipment and, when necessary, lead to a safe location for disposal of fluids being relieved;

(vi) Discharge lines from pressure relief devices shall be designed to facilitate drainage or be

fitted with drains to prevent liquid from collecting in the discharge side of a pressure relief device. The size of discharge lines shall be such that any pressure that may exist or develop will not reduce the relieving capacity of the pressure relief device or adversely affect the operation of the pressure relief device. It shall be as short and straight as possible and arranged to avoid undue stress on the pressure relief device; and

(vii) Pressure vessel pressure relief devices and discharge piping shall be safely supported. The reaction forces due to discharge of pressure relief devices shall be considered in the design of the inlet and discharge piping. Design of supports, foundations, and settings shall consider vibration (including seismic when necessary), movement (including thermal movement), and loadings (including reaction forces during device operation) in accordance with jurisdictional requirements, manufacturer's recommendations, and/or other industry standards, as applicable.

(e) Supports. Each pressure vessel shall be safely supported. The potential for future hydrostatic pressure tests of the vessel after installation shall be considered when designing vessel supports. Design of supports, foundations, and settings shall consider vibration (including seismic and wind loads where necessary), movement (including thermal movement), and loadings (including the weight of water during a hydrostatic test) in accordance with jurisdictional

requirements, manufacturer's recommendations, and other industry standards, as applicable.

(f) Piping. Piping loads on the vessel nozzles shall be considered. Piping loads include weight of the pipe, weight of the contents of the pipe, and expansion of the pipe from temperature and pressure changes (wind and seismic loads). The effects of piping vibration on the vessel nozzles shall also be considered.

(g) Bolting. All mechanical joints and connections shall conform to the manufacturers' installation instructions and recognized standards acceptable to the jurisdiction.

(h) Instruments and controls. The following shall apply to the instruments and controls of pressure vessels:

(1) Level indicating devices of steam drums of unfired steam boilers shall be provided with two level indicating devices. Direct level indicating devices shall be connected to a single water column or connected directly to the drum, and the connections and pipe shall be not less than NPS 1/2 (DN 15). Indirect level indicating devices acceptable to the jurisdiction may be used; and

(2) The pressure indicating devices of each pressure vessel, or system of pressure vessels with no intervening valves, shall be equipped with a pressure gage graduated to not less than one and a half (1-1/2) times nor more than three (3) times the pressure which the safety or safety relief valve is set.

(i) Isolating valves. Each pressure vessel or multiple pressure vessels connected in series shall have isolating valves which isolate the vessel or vessels from the system in which it or they are installed.

(j) Additional requirements for compressed air vessels. The following shall apply to compressed air vessels:

(1) Under no circumstances shall an air receiver be buried underground or located in an inaccessible place;

(2) Belt guards shall be installed on air compressor units fitted with drive belts;

(3) Drain pipe and valve shall be installed at the lowest point of every pressure vessel subject to internal corrosion to provide for draining or the removal of accumulated oil and water from an air receiver. Adequate automatic traps may be installed in addition to drain valves. The drain valve on an air receiver shall be opened and drained frequently at such intervals as to prevent the accumulation of excessive amounts of liquids in the receiver; and

(4) The use of thermoplastic piping, known as PVC piping, to transport compressed air or other compressed gases, or the testing of this piping with compressed air or other compressed gases, in exposed above ground locations is prohibited. All thermoplastic piping used to transport compressed air or other compressed gases shall be buried underground or encased in shatter-resistant materials. In designing a thermoplastic piping system to transport compressed air or other compressed gases, the strength at the operating temperature, the pressure, the energetics, and specific failure mechanisms shall be evaluated.

(k) Additional requirements for hot water storage tanks. The following shall apply to hot water storage tanks:

(1) Safety relief devices. Each hot water storage tank shall be equipped with an ASME/NB certified temperature and pressure relieving device set at a pressure not to exceed the maximum allowable working pressure and 210 degrees Fahrenheit or the maximum allowable working temperature of the vessel as designed. The temperature and

pressure relieving device shall meet the requirements of NBIC Part 1 4.5;

(2) Hot water storage tanks greater than 160 Psi maximum allowable working pressure shall be equipped with an ASME/NB certified temperature and pressure relieving device set at a pressure not to exceed the maximum allowable working pressure and 210 degrees Fahrenheit. In lieu of this requirement, such tanks may be equipped with incompressible fluid pressure rated relief valves with appropriate relieving capacity provided the hot water system is installed with an over-temperature protection that adequately prevent the generation of hot water in excess of 210 degrees Fahrenheit; and acceptable to the jurisdiction; Examples of system over-temperature protection:
    (A) Operating temperature control and high temperature limit switch with manual reset installed at the potential source;
    (B) Automatic self-adjusting over-temperature protection;
    (C) Tempering and mixing valves;
    (D) Solenoid operated dump valves with thermostat probe rated for 210 degrees Fahrenheit maximum scale range setting; and
    (E) Any other system of over-temperature protection controls to be demonstrated to function as designed and approved by the jurisdiction;

(3) Clearances. In addition to the clearance requirements under section 12-224.1-5(c), each hot water storage tank shall have at least twelve (12) inches bottom clearance;

(4) Each hot water storage tank shall have a thermometer so located that it shall be easily readable at or near the outlet. The

thermometer shall be so located that it shall at all times indicate the temperature of the water in the storage tank; and

(5) Shut off valves. Each hot water storage tank shall be equipped with stop valves in the water inlet piping and the outlet piping for the hot water storage tank to be removed from service without having to drain the complete system. Each hot water storage tank also shall be equipped with a bottom drain valve to provide for flushing and draining of the vessel.

(l) Additional requirements for pressure relief valves for steam to hot-water supply heat exchangers. When a hot-water supply is heated indirectly by steam in a coil or pipe within the service limitations set forth in the NBIC, the pressure of the steam used shall not exceed the safe working pressure of the hot water tank, and a safety relief valve of at least NPS 1 set to relieve at or below the maximum allowable working pressure of the tank, shall be applied on the tank.

(m) Description and concerns of specific types of pressure vessels.

(1) Compressed air vessels. The following applies to compressed air vessels:

(A) Considerations of concern include temperature variances, pressure limitations, vibration, and condensation. Drain connections shall be verified to be free of any foreign material that may cause plugging; and

(B) Inspections of compressed air vessels shall consist of the following:

(i) Welds. Inspect all welds for cracking or gouging, corrosion, and erosion. Particular attention shall be given to the welds that attach brackets supporting the compressor. These welds may fail due to vibration;

(ii) Shells and heads: externally, inspect the base material for environmental deterioration and impacts from objects. Hot spots and bulges are signs of overheating and shall be noted and evaluated for acceptability. Particular attention shall be paid to the lower half of the vessel for corrosion and leakage. For vessels with manways or inspection openings, an internal inspection shall be performed for corrosion, erosion, pitting, excessive deposit buildup, and leakage around inspection openings. Ultrasonic thickness testing (UT) may be used where internal inspection access is limited or to determine actual thickness when corrosion is suspected;

(iii) Fittings and attachments. Inspect all fittings and attachments for alignment, support, deterioration, damage, and leakage around threaded joints. Any internal attachments such as supports, brackets, or rings shall be visually examined for wear, corrosion, erosion, and cracks;

(iv) Operation. Check the vessel nameplate to determine the maximum allowed working pressure and temperature of the vessel. Ensure the set pressure of the safety valve does not exceed that allowed on the vessel nameplate and determine that the capacity of the safety valve is greater than the capacity of the compressor. Ensure there is a functioning manual or automatic condensate drain; and

(iv) Quick closure attachments. Filter-type vessels usually have one quick-type closure head for making filter changes, see NBIC Part 2, 2.3.6.5;

(2) The following shall apply to pressure vessels with quick-actuating closures:

(A) Due to the many different designs of quick-actuating closures, potential failures of components that are not specifically covered shall be considered. The scope of inspection shall include areas affected by abuse or lack of maintenance and a check for inoperable or bypassed safety and warning devices;

(B) Temperatures above that for which the quick-actuating closure was designed can have an adverse effect on the safe operation of the device. If parts are found damaged and excessive temperatures are suspected as the cause, the operating temperatures may have exceeded those temperatures recommended by the manufacturer. Rapid fluctuations in temperatures due to rapid start-up and shutdown may lead to cracks or yielding caused by excessive warping and high thermal stress. A careful observation shall be made of the condition of the complete installation, including maintenance and operation, as a guide in forming an opinion of the care the equipment receives. The history of the vessel shall be established, including: year built, materials of construction, extent of post weld heat treatment, previous inspection results, and repairs or alterations performed. Any leak shall be thoroughly investigated

and the necessary corrective action initiated;

(C) Inspection of parts and appurtenances. Seating surfaces of the closure device, including but not limited to the gaskets, O-rings, or any mechanical appurtenance to ensure proper alignment of the closure to the seating surface, shall be inspected. This inspection can be made by using powdered chalk or any substance that will indicate that the closure is properly striking the seating surface of the vessel flange. If this method is used, a check shall be made to ensure that:

(i) Material used shall not contaminate the gasket or material with which it comes into contact; and

(ii) The substance used shall be completely removed after the examination;

(D) The closure mechanism of the device shall be inspected for freedom of movement and proper contact with the locking elements. This inspection shall indicate that the movable portions of the locking mechanism are striking the locking element in such a manner that full stroke can be obtained. Inspection shall be made to ensure that the seating surface of the locking mechanism is free of metal burrs and deep scars, which would indicate misalignment or improper operation. A check shall be made for proper alignment of the door hinge mechanisms to ensure that adjustment screws and locking nuts are properly secured. When deficiencies are noted, the following corrective actions shall be initiated:

(i) If any deterioration of the gasket, O-ring, etc., is found, the gasket, O-ring, etc., shall be replaced immediately. Replacements shall be in accordance with the vessel manufacturer's specifications;

(ii) If any cracking or excessive wear is discovered on the closing mechanism, the owner or user shall contact the original manufacturer of the device for spare parts or repair information. If this cannot be accomplished, the owner or user shall contact an organization competent in quick-actuating closure design and construction prior to implementing any repairs;

(iii) Defective safety or warning devices shall be repaired or replaced prior to further operation of the vessel;

(iv) Deflections, wear, or warping of the sealing surfaces may cause out-of-roundness and misalignment. The manufacturer of the closure shall be contacted for acceptable tolerances for out-of-roundness and deflection; and

(v) The operation of the closure device through its normal operating cycle shall be observed while under control of the operator. This shall indicate if the operator is following posted procedures and if the operating procedures for the vessel are adequate;

(E) Gages, safety devices, and controls. The required pressure gage shall be installed so that it is visible from the operating area and located in such

a way that the operator can accurately determine the pressure in the vessel while it is in operation. The gage dial size shall be of such a diameter that it can be easily read by the operator. This gage shall have a pressure range of at least one and a half (1.5) times, but not more than four (4) times, the operating pressure of the vessel. There shall be no intervening valve between the vessel and gage;

(F) The pressure gage shall be of a type that will give accurate readings, especially when there is a rapid change in pressure. It shall be of rugged construction and capable of withstanding severe service conditions. Where necessary, the gage shall be protected by a siphon or trap;

(G) Pressure gages intended to measure the operating pressure in the vessel are not usually sensitive or easily read at low pressures approaching atmospheric. It may be advisable to install an auxiliary gage that reads inches of water and is intended to measure pressure from atmospheric through low pressures. This ensures that there is zero pressure in the vessel before opening. It would be necessary to protect the auxiliary low-pressure gage from the higher operating pressures;

(H) Provisions shall be made to calibrate pressure gages or to have them checked against a master gage as frequently as necessary;

(I) A check shall be made to ensure that the closure and its holding elements must be fully engaged in their intended operating position before pressure can be applied to the vessel. A safety interlock device shall be provided that

prevents the opening mechanism from operating unless the vessel is completely depressurized; and

(J) Quick-actuating closures held in position by manually operated locking devices or mechanisms, and which are subject to leakage of the vessel contents prior to disengagement of the locking elements and release of the closure, shall be provided with an audible and/or visible warning device to warn the operator if pressure is applied to the vessel before the closure and its holding elements are fully engaged, and to warn the operator if an attempt is made to operate the locking device before the pressure within the vessel is released. Pressure tending to force the closure clear of the vessel must be released before the closure can be opened for access; and

(3) Inspection of Pressure Vessels for Human Occupancy (PVHOs). The following shall apply to the inspection of PVHOs:

(A) General and operational. PVHOs shall be constructed in accordance with ASME PVHO-1. This code adopts ASME BPV Section VIII and therefore the vessels shall bear a "U" or "U2" ASME designator. Inspections should be conducted using ASME PVHO-2 for reference;

(B) Cast and ductile iron fittings are not allowed;

(C) Due to the human occupancy element, a person shall be in attendance to monitor the PVHO when in operation, in the event there is an accident;

(D) The installation shall be such that there is adequate clearance to inspect it properly. In some applications, such as underground tunneling, it may be

impossible to perform a complete external inspection;

(E) Internal inspection. Where existing openings permit, perform a visual internal inspection of the vessel. Look for any obvious cracks and note areas that are subject to high stress such as welds, welded repairs, head-to-shell transitions, sharp interior corners, and interior surfaces opposite external attachments or supports. The vessel shall be free of corrosion, damage, dents, gouges, or other damage. All openings leading to external fittings or controls shall be free from obstruction. All exhaust inlets shall be checked to prevent a chamber occupant from inadvertently blocking the opening;

(F) External inspection. The inspector shall closely examine the external condition of the pressure vessel for corrosion, damage, dents, gouges, or other damage. The lower half and the bottom portions of insulated vessels shall receive special focus, as condensation or moisture may gravitate down the vessel shell and soak into the insulation, keeping it moist for long periods of time. Penetration locations in the insulation or fireproofing such as saddle supports, sphere support legs, nozzles, or fittings shall be examined closely for potential moisture ingress paths. When moisture penetrates the insulation, the insulation may actually work in reverse, holding moisture in the insulation or near the vessel shell. Insulated vessels that are run on an intermittent basis or that have been out of service require close scrutiny. In general, a visual

inspection of the vessel's insulated surfaces shall be conducted once per year. The most common and superior method to inspect for suspected corrosion under insulation (CUI) damage is to completely or partially remove the insulation for visual inspection. The method most commonly utilized to inspect for CUI without insulation removal is by X-ray and isotope radiography (film or digital), or by real time radiography, utilizing imaging scopes and surface profilers. The real-time imaging tools will work well if the vessel geometry and insulation thickness allows. Other less common methods to detect CUI include specialized electromagnetic methods (pulsed eddy current and electromagnetic waves) and long-range ultrasonic techniques (guided waves). There are also several methods to detect moisture soaked insulation, which is often the beginning for potential CUI damage. Moisture probe detectors, neutron backscatter, and thermography are tools that can be used for CUI moisture screening. Proper surface treatment (coating) of the vessel external shell and maintaining weather-tight external insulation are the keys to prevention of CUI damage;

(G) Inspection of parts and appurtenances (e.g., piping systems, pressure gage, bottom drain). As stated above, cast iron is not allowed on PVHOs and shall be replaced with parts fabricated with other suitable materials, in accordance with ASME BPVC Section II. If valves or fittings are in place, check to ensure that these are complete and functional. The inspector shall note the pressure

indicated by the gage and compare it with other gages on the same system. If the pressure gage is not mounted on the vessel itself, it shall be ascertained that the gage is installed on the system in such a manner that it correctly indicates actual pressure in the vessel. The inspector shall verify that the vessel is provided with a drain opening. The system shall have a pressure gage designed for at least the most severe condition of coincident pressure in normal operation. This gage shall be clearly visible to the person adjusting the setting of the pressure control valve. The graduation on the pressure gage shall be graduated to not less than one and a half (1.5) times the maximum allowable working pressure (MAWP) of the vessel. Provisions shall be made to calibrate pressure gages or to have them checked against a standard test gage. Any vents and exhausts shall be piped at least ten (10) feet from any air intake. Venting shall be provided at all high points of the piping system;

(H) Inspection of view ports and windows. Each window shall be individually identified and be marked in accordance with PVHO-1. If there are any penetrations through windows, they must be circular. Windows must be free of crazing, cracks, and scratches. Windows and viewports have a maximum interval for seat or seal inspection and refurbishment. Documentation shall be checked to ensure compliance with PVHO-2, Table 2-4.3- 1, Table 2-4.3-2 (see Exhibit 1); and

(I) Inspection of pressure relief devices. Pressure relief devices must have a

quick opening manual shutoff valve installed between the chamber and the pressure relief device, with a frangible seal in place, within easy access to the operator. The pressure relief device shall be constructed in accordance with ASME BPVC Section VIII. The discharge from the pressure relief device must be piped outside to a safe point of discharge. Rupture disks may be used only if they are in series with a pressure relief valve, or when there is less than two (2) cubic feet of water volume. Verify that the safety valve is periodically tested either manually by raising the disk from the seat or by removing and testing the valve on a test stand." [Eff and comp] (Auth: HRS §397-4) (Imp: HRS §397-4)

Table 2-4.3-1 Maximum Intervals for Maintenance Viewport Inspection

Actual Service Duration and/or Cycles	Protected	Typical	Severe Service
Less than design life	36 months	24 months	18 months
Greater than design life	24 months	18 months	12 months

GENERAL NOTES:

(a) Window removal is not required unless deemed necessary by the inspector.

(b) Because of the critical adjustments of tie rods, cylindrical window chambers should not normally be disassembled on a periodic basis for performance of maintenance viewport inspections.

Table 2-4.3-2 Maximum Intervals for Refurbishment

Type	Maximum Interval
Cylindrical window chambers	Completely refurbish at 10-yr intervals regardless of usage
Marine intermittent submersion	Completely refurbish at 10-yr intervals regardless of usage
Marine continuous submersion	Completely refurbish at expiration of extended service life
All other window types	Completely refurbish at expiration of extended service life

GENERAL NOTE: Refurbishment requires a more detailed (hands-on) inspection of the viewport components and requires the complete removal and refurbishment of all viewport components.

10. Chapter 12-225, Hawaii Administrative Rules, entitled "Pressure Systems", is repealed as follows:

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILER AND PRESSURE VESSELS

CHAPTER 225

PRESSURE SYSTEMS

Historical Note: Chapter 225 of title 12 is based on chapter 377 of the Hawaii Occupational Safety and Health Standards, Rules and Regulations. [Eff 7/11/74; am 12/30/76; am 8/1/78; R 12/6/82]

[**§12-225-1 Definitions**.

"Authorized inspector" means a person authorized by the ASME Code to inspect and stamp piping systems.

"Boiler external piping" means that piping from the beginning of the well head to the throttle valve and includes pipe, flanges, bolting, gaskets, valves, relief devices, fittings, and the pressure-containing portions of other piping components.

"Certificate of authorization" means a certificate of the pressure vessel system which has been fabricated in accordance with this chapter.

"Pressure system" means all unfired pressure vessels and pressure pipe components of any closed liquid or vapor distribution system operating at a pressure of more than 15 PSIG or a temperature in excess of 250° F (121.1° C), or both, and obtaining its heat from a source other than the combustion of gaseous, liquid or solid fuels, electricity, or nuclear sources, or obtaining its pressure from a pump, compressor, or other pressure producing device vvhich has a N.P.S. diameter in excess of 1/2 inch.]
[Eff 8/5/88; comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**§12-225-2 Geothermal energy systems**. (a) Geothermal energy systems operating at a pressure of more than 15 PSI are subject to the provisions of this chapter. They shall be designed and erected in accordance with all applicable requirements for design, materials, fabrication, erection, test, and inspection of power piping systems included in the ASME B31.1.

(b) Boiler external piping as defined in section 12-225-1 shall be provided with data reports, inspection, and stamping. as required by Section I of the ASME Code. The quality control system requirements of Section I of the ASME Code shall apply. All other piping shall meet the requirements of ASME B31.1, and

~~be provided with data reports by an authorized inspector.~~

~~(c) Piping for which inspection and stamping is required as determined in accordance with subsection (b) shall be inspected during construction and after completion and, at the opinion of the authorized inspector, at such stages of the work as he may designate. Each assembler or erector is required to arrange for the services of authorized inspectors as defined in Section 1 PG-91 of the ASME Code.~~

~~(1) Certification by stamping and data reports, where required, shall he as per Section I Part PG Rules 104, 105, and 109 through 112 of the ASME Code.~~

~~(2) All data reports shall be filed with the department's chief boiler inspector.~~

~~(3) All pressure vessels forming a part of a geothermal energy system shall be fabricated in accordance with the provisions of Section I or Section VIII Division 1 or Division 2, as applicable, of the ASME Code by a manufacturer who is in possession of the appropriate symbol stamp, a valid certificate of authorization, and National Board registered.~~

~~(4) When pressure vessels having a manhole opening form part of a geothermal pressure system, the; piping-upstream from the pressure vessel shall be fitted with two stop valves having an ample free-blow drain between them. In determining the existence of two stop valves, the well head stop valve shall not be counted.~~

~~(5) When multiple geothermal wells supply the same pressure system, all pressure vessels having a manhole opening shall be fitted on both the up stream side and the down stream side with two stop valves having an ample free-blow drain between them.~~

~~(6) Plans and material specifications for geothermal energy systems within the scope of this code shall be submitted to the~~

~~department's chief boiler inspector, prior to commencement of work, for review.~~] [Eff 8/5/88; am and comp 12/6/90; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-225-3 Overpressure protection~~**. ~~(a) All pressure vessels within the scope of this chapter which can be isolated under pressure, irrespective of size or pressure, shall be provided with protective devices of sufficient pressure relieving capacity that shall prevent the pressure from rising more than 10 per cent or 3 PSI, whichever is greater, above the maximum allowable working pressure of the vessel or system; except when multiple pressure relieving devices are provided and set in accordance with Section VIII, Division 1 Part UG Rule 134(a) of the ASME Code, they shall prevent the pressure from rising more than 16 per cent or 4 PSI, whichever is greater, above the maximum allowable working pressure of the vessel or system.~~

~~(b) Nonreclosing pressure-relief devices of the rupture disk type, fabricated, marked, and installed in accordance with Section VIII Division 1 of the ASME Code, shall be used to meet the requirements of this chapter. A full-area stop valve may be installed between the vessel and the nonreclosing pressure relief device for repair purposes only provided the installation is in accordance with Section VIII Division 1 Part 1 UG Rule 135 and appendix M of the ASME Code.~~] [Eff 8/5/88; am and comp 12/6/90; am 11/18/12; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

[**~~§12-225-4 Air conditioning and refrigeration systems~~**. ~~Air conditioning and refrigeration systems of the vapor compression type are not subject to the conditions of this chapter, except that all pressure~~

~~vessels used in these systems shall be fabricated in accordance with the provisions of Section VIII Division 1 or Division 2, as applicable, of the ASME Code by a manufacturer who is in possession of the appropriate code symbol stamp and a valid certificate of authorization, and in accordance with ANSI/ASHRAE Standard 1.5-1989, Safety Code for Mechanical Refrigeration.~~]" [Eff 8/5/88; am and comp 12/6/90; R] (Auth: HRS §397-4) (Imp: HRS §397-4)

11. Chapter 12-225.1, Hawaii Administrative Rules, entitled "Pressure Systems", is adopted to read as follows:

"HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 10

BOILER AND PRESSURE VESSELS

CHAPTER 225.1

PRESSURE SYSTEMS

Historical Note: This chapter is based substantially upon chapter 225. [Eff 8/5/88; am and comp 12/6/90; am 11/18/12; R]

§12-225.1-1 Definitions. As used in this chapter:

"Authorized inspection agency" means an agency meeting the requirements of NB-360, National Board Acceptance of Authorized Inspection Agencies (AIA), and accredited by the American Society of Mechanical Engineers.

"Authorized inspector" means an individual holding a valid National Board Authorized Inspector Commission (AI) and designated as such by an AIA.

"Boiler external piping" means that piping from the beginning of the well head to the throttle valve and includes pipe, flanges, bolting, gaskets, valves, relief devices, fittings, and the pressure containing portions of other piping components and designed in accordance with ASME B31.1.

"Geothermal energy systems" means geothermal energy systems operating at a pressure of more than fifteen (15) psi.

"Pressure systems" means all unfired pressure vessels and pressure pipe components of any closed liquid or vapor distribution system operating at a pressure of more than fifteen (15) psig or a temperature more than 250 degrees Fahrenheit, or both, and obtaining its heat from a source other than the combustion of gaseous, liquid, or solid fuels, and electricity. [Eff and comp] (Auth: §397-4) (Imp: HRS §397-4)

§12-225.1-2 Geothermal energy systems. (a) All pressure vessels forming a part of a geothermal energy system shall be designed and constructed in accordance with the requirements of ASME BPV Code Section I, or Section VIII Division 1, or Division 2, as applicable, and registered with the National Board. New installations shall require filing of an application for installation permit prior to the commencement of work as prescribed in section 12-220-2.1.

(b) All boiler external piping shall be designed and constructed in accordance with the requirements of

the ASME B31.1. Application for authorization for the installation of boiler external piping shall be as prescribed in section 12-220-9.1.

(c) When pressure vessels having a manhole opening form part of a geothermal pressure system, the piping upstream from the pressure vessel shall be fitted with two stop valves having an ample free blow drain between them. In determining the existence of two stop valves, the well head stop valve shall not be counted.

(d) When multiple geothermal wells supply the same pressure system, all pressure vessels having a manhole opening shall be fitted on both the upstream side and the downstream side with two stop valves having an ample free blow drain between them.

[Eff and comp] (Auth: §397-4) (Imp: HRS §397-4)

§12-225.1-3 Overpressure protection. All pressure vessels within the scope of this chapter that can be isolated under pressure shall be provided with pressure relieving devices in accordance with the requirements of the applicable ASME BPVC."

[Eff and comp] (Auth: §397-4) (Imp: HRS §397-4)