Regulatory Analysis

Notice of Intended Action to be published: Iowa Administrative Code 875—Chapter 92
"Power Boilers"

Iowa Code section(s) or chapter(s) authorizing rulemaking: 89.14
State or federal law(s) implemented by the rulemaking: Executive Order 10

Public Hearing

A public hearing at which persons may present their views orally or in writing will be held as follows:

October 22, 2024 9 to 9:30 a.m.	Lake Conference Room 6200 Park Avenue, Suite 100 Des Moines, Iowa

Public Comment

Any interested person may submit written or oral comments concerning this Regulatory Analysis. Written or oral comments in response to this Regulatory Analysis must be received by the Labor Services Division no later than 4:30 p.m. on the date of the public hearing. Comments should be directed to:

Mitchell Mahan
Iowa Department of Inspections, Appeals, and Licensing
6200 Park Avenue, Suite 100
Des Moines, Iowa 50321-1270
Phone: 515.443.1051
Email: mitchell.mahan@dia.iowa.gov

Purpose and Summary

This proposed rulemaking rescinds Chapter 92 in accordance with the goals and directives of Executive Order 10. Proposed Chapter 92 requires certain design features and certain ways of operating boilers.

Analysis of Impact

1. Persons affected by the proposed rulemaking:

- Classes of persons that will bear the costs of the proposed rulemaking:

Owners of power boilers installed on or after September 20, 2006, will bear the costs.

- Classes of persons that will benefit from the proposed rulemaking:

The public and anyone potentially in harm's way of a destructive failure of a boiler covered by this chapter will benefit.

2. Impact of the proposed rulemaking, economic or otherwise, including the nature and amount of all the different kinds of costs that would be incurred:

- Quantitative description of impact:

The rulemaking requires certain costs related to inspection and maintenance.

- Qualitative description of impact:

There is no known qualitative impact.

3. Costs to the State:

- Implementation and enforcement costs borne by the agency or any other agency:

The agency has costs associated with running the Elevator, Boiler, and Amusements section.

- Anticipated effect on state revenues:

The rulemaking has no anticipated fiscal impact.

4. Comparison of the costs and benefits of the proposed rulemaking to the costs and benefits of inaction:

The benefit of safe boilers outweighs any costs.

5. Determination whether less costly methods or less intrusive methods exist for achieving the purpose of the proposed rulemaking:

The Department has not identified any less costly or less intrusive methods.

6. Alternative methods considered by the agency:

- Description of any alternative methods that were seriously considered by the agency:

No alternative methods were seriously considered.

- Reasons why alternative methods were rejected in favor of the proposed rulemaking:

Not applicable.

Small Business Impact

If the rulemaking will have a substantial impact on small business, include a discussion of whether it would be feasible and practicable to do any of the following to reduce the impact of the rulemaking on small business:

- Establish less stringent compliance or reporting requirements in the rulemaking for small business.
- Establish less stringent schedules or deadlines in the rulemaking for compliance or reporting requirements for small business.
- Consolidate or simplify the rulemaking's compliance or reporting requirements for small business.
- Establish performance standards to replace design or operational standards in the rulemaking for small business.
- Exempt small business from any or all requirements of the rulemaking.

If legal and feasible, how does the rulemaking use a method discussed above to reduce the substantial impact on small business?

The rules do not have a substantial impact on small business.

Text of Proposed Rulemaking

ITEM 1. Rescind 875—Chapter 92 and adopt the following **new** chapter in lieu thereof:

CHAPTER 92
POWER BOILERS

875—92.1(89) Scope. This chapter applies to all power boilers, and it applies to miniature power boilers installed on and after September 20, 2006. 875—Chapter 93 applies to miniature power boilers installed prior to September 20, 2006.

875—92.2(89) Codes adopted by reference. The codes listed in 875—Chapter 91 apply to objects covered by this chapter.

875—92.3(89) Maximum allowable working pressure for steel boilers. This rule applies to power boilers installed prior to July 1, 1983. A boiler constructed with fusion-welded seams and not radiographed and stress relieved during construction shall not be operated at a pressure in excess of 15 pounds per square inch. Boilers with fusion-welded seams that are radiographed and stress relieved

and constructed to ASME Code requirements in effect when the boiler was constructed may be operated at a pressure as established in subrules 92.4(1) and 92.4(2).

92.3(1) *Calculation.* The maximum allowable working pressure on the shell of a boiler is be determined by the strength of the weakest course computed from the thickness of the plate, the tensile strength of the plate, the efficiency of the longitudinal joint, the inside diameter of the course, and the factor of safety allowed by these rules. The formula for determining the maximum allowable working pressure is:

$$\frac{TStE}{RFS} = \text{Maximum allowable working pressure, psig.}$$

Where:

TS = Ultimate tensile strength of shell plate(s), psig. When the tensile strength of a steel plate(s) is unknown, it shall be taken as 55,000 psig for temperatures not exceeding 650 degrees F.

t = Minimum thickness of shell plates of the weakest course, in inches.

E = Efficiency of longitudinal joint calculated pursuant to construction or installation code.

R = Inside radius of the weakest course of the shell or drum, in inches.

FS = Factor of safety specified in subrule 92.4(2).

92.3(2) *Factor of safety requirements.*

a. The lowest factor of safety on boilers is four, except for horizontal tubular boilers having continuous lap seams more than 12 feet in length where the factor of safety is eight.

b. Boilers that are reinstalled and have lap riveted construction or seams of butt and double strap riveted construction use ASME Code, Section I (1971).

875—92.4(89) Maximum allowable working pressure and temperature for cast iron headers and mud drums. This rule applies to power boilers installed prior to July 1, 1983.

92.4(1) *Tube boiler.* The maximum allowable working pressure on a watertube boiler, the tubes of which are secured in cast iron or malleable iron headers or that have cast iron mud drums, will not exceed 160 psig or a temperature of 250 degrees F.

92.4(2) *Maximum steam pressure.* The maximum steam pressure on any boiler constructed of cast iron in which steam is generated is 15 psig.

875—92.5(89) Rivets. This rule applies to power boilers installed prior to July 1, 1983. When the diameter of the rivet holes in the longitudinal joints of a boiler is not known, the diameter and cross-sectional area of rivets, after driving, shall be selected from ASME Code, Section I (1971).

875—92.6(89) Safety valve requirements. This rule applies to power boilers installed prior to July 1, 1983.

92.6(1) The use of weighted-lever safety valves or safety valves having either the seat or disk of cast iron is prohibited. All power boilers will have direct, springloaded, pop-type safety valves that conform to the construction or installation code.

92.6(2) Each boiler will have at least one safety valve. All boilers with more than 500 square feet of water heating surface or an electric power input of more than 1100 kilowatts will have two or more safety valves.

92.6(3) The safety valve or valves will 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.

92.6(4) No valves of any type will be placed between the safety valve and the boiler. If an escape pipe is used, no valve will be placed between the safety valve and the atmosphere. When an escape pipe is used, it will 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 escape pipe. Any elbow on an escape pipe will be located close to the safety valve outlet or the escape pipe and will be anchored and supported securely. All safety valve discharges will be so located or piped as to be carried away from

walkways or platforms. When the safety valve is vented to the outside atmosphere, the second escape pipe will be arranged as shown in Figure 1.

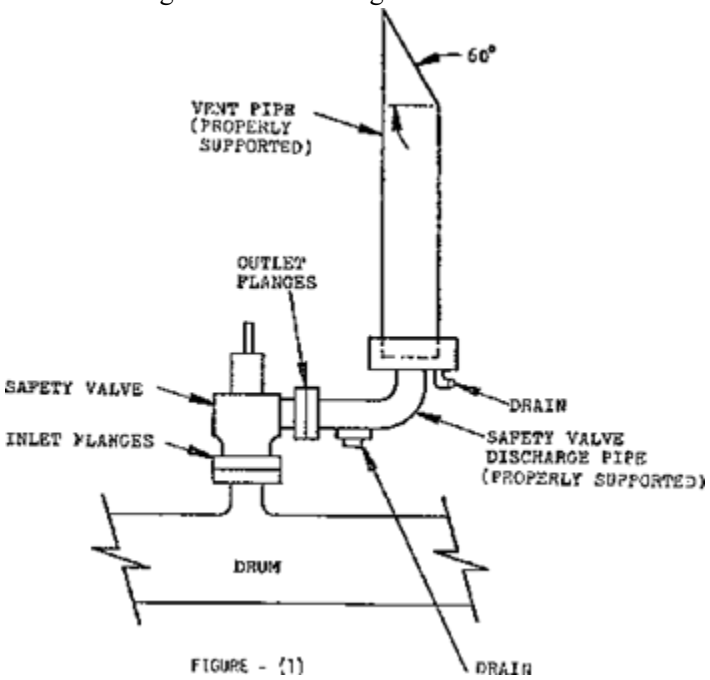


FIGURE - (1)

92.6(5) The safety valve capacity of each boiler will 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 5 percent above the highest pressure to which any valve is set and in no case to more than 6 percent above maximum allowable working pressure.

92.6(6) One or more safety valves on every boiler will be set at or below the maximum allowable working pressure. The remaining valves may be set within a range of 3 percent above the maximum allowable working pressure, but the range setting of all the safety valves on a boiler will not exceed 10 percent of the highest pressure at which any valve is set.

92.6(7) When two or more boilers operating at different pressures and safety valve settings are interconnected, the lowest pressure boilers or interconnected piping will be equipped with safety valves of sufficient capacity to prevent overpressure, considering the maximum generating capacity of all boilers.

92.6(8) In those cases where the boiler is supplied with feedwater directly from water mains without the use of feeding apparatus (not including return traps), safety valves will not be set at a pressure greater than 94 percent of the lowest pressure maintained in the supply main feeding the boiler.

92.6(9) The minimum safety valve relieving capacity will be determined on the basis of the pounds of steam generated per hour per square foot of boiler heating surface and waterwall heating surface as given in the following table. This method will not be used on electric boilers, waste heat boilers and forced-flow steam generators without a fixed steam and water line.

Minimum Pounds of Steam Per Hour Per Square Foot of Heating Surface

Boiler Heating Surface:	Firetube Boilers	Watertube Boilers
Hand Fired	5	6
Stoker Fired	5	8
Oil, Gas, or Pulverized Fuel Fires	8	10
Waterwall Heating Surface:		
Hand Fired	8	8

Stoker Fired	10	12
Oil, Gas, or Pulverized Fuel Fires	14	16

92.6(10) Safety valve sizing.

a. When a boiler is fired only by a gas having a heat value not in excess of 200 Btu's per cubic feet the minimum safety valve relieving capacity may be based on the value given for hand-fired boilers above.

b. The minimum safety valve relieving capacity for electric boilers will be 3½ pounds per hour per kilowatt input.

c. Maximum steaming capacity for safety valves will be the value stated on design documents or will be calculated by multiplying horsepower by 34.5.

875—92.7(89) Boiler feeding requirements. This rule applies to power boilers installed prior to July 1, 1983.

92.7(1) Each boiler will have a feed supply that will permit it to be fed at any time while under pressure. A boiler having more than 500 square feet of water-heating surface will have at least two means of feeding, one of which will be an approved feed pump, injector, or inspirator. One source of feed is directly from the water main. Boilers fired by gaseous, liquid, or solid fuel in suspension may be equipped with a single means of feeding water provided means are furnished for the immediate shutoff of heat input prior to the water level reaching the lowest permissible level. The feedwater will be introduced into the boiler in such a manner that it will not be discharged close to riveted joints of shell or furnace sheets, directly against surfaces exposed to products of combustion, or directed to surfaces subject to radiation from the fire. The feed piping to the boiler will be provided with a check valve near the boiler and a stop valve between the check valve and the boiler.

92.7(2) When two or more boilers are fed from a common source, there will also be a valve on the branch to each boiler between the check valve and source of supply. Whenever a globe valve is used on feed piping, the inlet will be under the disk of the valve. In all cases where returns are fed back to the boiler by gravity, there will be a check valve and stop valve in each return line. The stop valve will be placed between the boiler and the check valve, and both will be located as close to the boiler as is practicable.

875—92.8(89) Water level indicator requirements. This rule applies to power boilers installed prior to July 1, 1983. Outlet connections that allow the escape of an appreciable amount of steam or water will not be placed on the piping. However, this rule does not prohibit the installation of damper regulators, feed water regulators, low-water fuel cutouts, drains, or steam gages. The water column will be provided with a drain of at least ¾-inch piping size. The drain must have a valve and be piped to a safe location. Each boiler will have three or more gage cocks located within the visible length of the water glass, except when the boiler has two water glasses located at the same horizontal lines. Only two gage cocks are required on boilers not over 36 inches in diameter with a heating surface not exceeding 100 square feet. Gage cocks are not required on electric boilers.

875—92.9(89) Pressure gage requirements. This rule applies to power boilers installed prior to July 1, 1983. Each boiler will have a pressure gage so located that the gage is readable. The pressure gage will be installed so that it will at all times indicate the pressure in the boiler. Each steam boiler will have the pressure gage connected to the steam space or to the water column or its steam connection. A valve or cock will be placed in the gage connection adjacent to the gage. An additional valve or cock may be located near the boiler providing it is locked or sealed in the open position. No other shutoff valves will be located between the gage and the boiler. The pipe connection will be of ample size and arranged so that it may be cleared by blowing out. For a steam boiler the gage or connection will contain a siphon or equivalent device that will develop and maintain a water seal that will prevent steam from entering the gage tube. Pressure gage connections will be suitable for the maximum allowable working pressure and temperature, but if the temperature exceeds 406 degrees F, brass or

copper pipe or tubing will not be used. The connections to the boiler, except the siphon, if used, will not be less than ¼-inch standard pipe size, but where steel or wrought-iron pipe or tubing is used, they will not be less than ½-inch inside diameter. The minimum size of a siphon, if used, will be ¼-inch inside diameter. The dial of the pressure gage will be graduated to approximately double the pressure at which the safety valve is set, but in no case to less than 1½ times this pressure.

875—92.10(89) Steam stop valve requirements. This rule applies to power boilers installed prior to July 1, 1983. Each steam outlet from a boiler, except safety valve and water-column connections, will be fitted with a stop valve located as close as practicable to the boiler. When a stop valve is so located that water can accumulate, ample drains will be provided. The drainage will be piped to a safe location and will not be discharged on the top of the boiler or its setting. When boilers provided with manholes are connected to a common steam main, the steam connection from each boiler will be fitted with two stop valves having an ample free-blowing drain between them. The discharge of the drain will be piped clear of the boiler setting. The stop valves will consist of one automatic nonreturn valve next to the boiler and a second valve of the outside screw and yoke type.

875—92.11(89) Blowoff connection requirements. This rule applies to power boilers installed prior to July 1, 1983. Each boiler will have a blowoff pipe fitted with valve or cock, in direct connection with the lowest water space practicable.

92.11(1) When the maximum allowable working pressure exceeds 125 psig, the blowoff pipe will be at least schedule 80 from the boiler to the valve or valves and will run full size without reducers or bushings. Galvanized materials will not be used.

92.11(2) All fittings between the boiler and valve will be steel or at least schedule 80 fittings of bronze, brass, malleable iron, or cast iron, all of which will be suitable for the pressure and temperature. In case of replacement of pipe or fittings in the blowoff lines, as specified in this paragraph, they will be installed in accordance with the rules of new installations.

92.11(3) When the maximum allowable working pressure exceeds 125 psig, each bottom blowoff pipe will be fitted with at least a 250-pound standard valve or cock. Two valves, or a valve and a cock, should be used on each blowoff.

92.11(4) When exposed to direct furnace heat, a bottom blowoff pipe will be protected by firebrick or other heat resisting material so arranged that the pipe may be inspected.

92.11(5) An opening in the boiler setting for a blowoff pipe will be arranged to provide for free expansion and contraction.

These rules are intended to implement Iowa Code chapter 89.