State of New Jersey
Department of Labor and Industry
Division of Labor

MECHANICAL ENGINEERING BUREAU

129 E. Front Street
Trenton, New Jersey

RULES AND REGULATIONS

Engineers' and Firemen's Licenses.
Steam Boiler Construction and Inspection.
Refrigeration, Installation and Plant Inspection.

Pressure Vessels, Fired and Unfired

(In accordance with Title 34, Chapters 1 and 7 of the Revised Statutes.)

Effective May 1, 1955
Amended March 10, 1958

GUIDE RULES

1

The Mechanical Engineering Bureau, Division of Engineers' License, Steam Boiler, Pressure Vessel and Refrigeration Inspection and the New Jersey Board of Boiler Rules were instituted in the interest of safety and efficiency in boiler construction and inspection and power plant engineering practice in general throughout the State, for the protection of life and property. With that end in view, engineers, firemen, boiler inspectors and others concerned should advise this Bureau of any existing dangerous hazards or law violations that come to their attention. Such reports will be considered confidential.

2

Operating engineers and firemen are issued licenses in various classifications and grades after examination in accordance with their qualifications. It is the duty of engineers and firemen on watch to give constant attention to their plant to the extent that they know at all times it is operating with safety. The length of time during which they can properly be away from the plant varies according to the nature and size of the plant and the load conditions. Under no circumstances should an engineer or fireman be required by the owner or management to stay away from the plant to the detriment of its safe operation.

It is the responsibility of the licensed operator to determine how long he can stay away from his plant and not jeopardize the safe operation of the equipment under his care.

3

Equipment requiring the attention of licensed operators is listed below:

1. Any steam boiler or steam generator having safety valve or valves set higher than fifteen pounds per square inch gage and rated over six horsepower.
2. Any steam boiler or steam generator serving a building of public assembly and having the safety valves set at fifteen pounds per square inch gage or less and having more than 499 square feet of heating surface.
3. Any steam turbine, steam engine or other steam driven prime mover, rated over six horsepower.
4. Any refrigerating system using ammonia or ethyl chloride as the refrigerant and rated over six tons refrigerating capacity.
5. Any stationary internal combustion power generator rated over 149 horsepower.

4

All engineers, builders, owners, lessees, operators and inspectors should be conversant with these rules and regulations.

5

Always have boiler and refrigeration plant certificates and licenses posted in a conspicuous place in boiler or engine room.

6

Manufacturer's data reports (and blueprints and calculations when required) for high pressure boilers and unfired pressure vessels manufactured or used within the jurisdiction of this State must be filed with the Mechanical Engineering Bureau, Department of Labor and Industry, Trenton, N. J.

7

When contracting for or purchasing new or second hand boilers, unfired pressure vessels, or boiler appliances, always specify A. S. M. E. Code, which is New Jersey Standard. Copies of the various sections of the Code may be obtained by addressing the American Society of Mechanical Engineers at 29 West 39th Street, New York City.

8

When writing this Bureau in reference to a boiler or unfired pressure vessel, always give New Jersey State inspection registration number in the upper left corner of the registration certificate, manufacturer's serial number, A. S. M. E. or National Board number and name of manufacturer.

9

When writing in reference to A. S. M. E. Boiler or Unfired Pressure Vessel Code always refer to section, page and paragraph

10

When writing in reference to refrigerating plants which are under inspection and operation regulations, always give New Jersey State inspection registration number in the upper left corner of the registration certificate.

11

Address all communications to the Mechanical Engineering Bureau, Department of Labor and Industry, Trenton, New Jersey.

BOARD OF EXAMINING ENGINEERS

A. George Erholm, *Deputy Director*
John L. Sullivan, *Assistant Chief*
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ENGINEERS' AND FIREMEN'S LICENSES

1

Application for license must be made on form provided by the Mechanical Engineering Bureau. The first or original application must be certified to by two engineers each holding a valid New Jersey license. Substitution for the signatures of two N. J. Engineers may be made by presenting a Marine Engineer's License, another State or City license, an honorable U. S. Service or Merchant Marine discharge showing required engineering experience, or two written statements from former or present employers showing required engineering experience.

Application for a license other than original must be made on a "Higher Grade or Additional Classification Application."

2

Applications must be typewritten or neatly and legibly printed in ink. All applications must be fully completed and notarized. Incomplete or improper applications will not be accepted.

3

An "Original Application" will not be accepted from a non-resident unless a letter is furnished by a prospective employer in the State of New Jersey.

4

Foreign born applicants must have full citizenship papers and present them at time of examination.

5

No license will be granted to a person less than eighteen years of age.

6

The fee for examination in any classification or grade, whether "Original License," "Raise of Grade," or "Additional Classification," is stated on application form, and must accompany same. No annual renewal fee is charged for additional classifications on any license.

7

FEE FOR APPLICATION FOR LICENSE SHALL BE IN THE FORM OF CHECK OR MONEY ORDER MADE PAYABLE TO THE ORDER OF THE MECHANICAL ENGINEERING BUREAU. NO RISK WILL BE ASSUMED BY THIS OFFICE FOR LOSS IN TRANSMISSION OF FEE.

8

All correspondence relative to licenses or applications shall be addressed to the MECHANICAL ENGINEERING BUREAU, DEPARTMENT OF LABOR AND INDUSTRY, TRENTON, N. J. Notify the Bureau of any change of residence. When writing refer to license number.

9

Applicants will be notified when and where to appear for examination. Failure to appear will be considered sufficient cause to discard the application, unless satisfactory reasons are given.

10

Examinations will be held on the first Wednesday of each month, at the State House, Trenton, and at various other points throughout the State when warranted.

11

License Classifications:

1—A, B and C, Steam Stationary—Power and Industrial.
2—A, B and C, Refrigeration.
3—A, B and C, Steam Stationary—Heating.
8—A, B and C, Steam Locomotive.
8—C, Steam Bridges.
8—C, Steam Portable—Building Hoists, Road Roller, Pile Drivers and Steam Shovels.
9—A and B, Steam Hoisting-Locomotive Cranes.
10—A, B and C, Internal Combustion,
Boiler Fireman in Charge—High Pressure.
Boiler Fireman—High Pressure.
Boiler Fireman in Charge—Low Pressure.
Boiler Fireman—Low Pressure.

Separate copies of license regulations covering power generating plants, refrigerating plants and boiler plants are available upon application.

12

The letters "A," "B" and "C" are used to designate GRADE of license. "A" or Gold Seal, designates a first-grade license; "B" or Red Seal, a second-grade license; and "C" or Blue Seal, a third-grade license. A Black Seal designates Boiler Fireman. Licenses bearing merely the impression of the Department Seal are issued as Special Licenses and are limited to operation of the plant for which issued. These licenses may be transferred to similar plants upon approval following written request by applicant.

13

To be eligible for fireman's examination, applicant must have had at least three months' experience as a fireman's helper and have attained the age of eighteen years.

14

A licensed fireman is eligible for examination for an "In Charge" license after three months actual service in the operation of boilers.

15

To be eligible for a Third-Grade steam engineer's examination (1-C, 3-C or 8-C) applicant must have a Fireman-In-Charge license and show at least six months subsequent experience in the operation of the type of steam boilers required for such classification, or as an assistant in the operation of equipment requiring supervision by an engineer with the desired classification; or, lacking these qualifications, must have served at least two years as a fireman or one year as a fireman and one year as an assistant to an engineer as specified above.

16

To be eligible for a Third-Grade refrigeration engineer's examination (2-C) where the refrigerant used is anhydrous ammonia, applicant must have had at least one year's experience as an oiler, or assistant; or six months' experience as an operator of such equipment.

17

To be eligible for a Third-Grade internal combustion engineer's examination (10-C) applicant must have had at least one year's experience as an oiler, or assistant; or six months' experience as an operator of such equipment.

18

An applicant for original license, not of higher grade than third, or Blue Seal, may show in writing, as a substitute for a minor portion of the experience listed above, non-operating experience, such as

servicing, maintenance, repair or installation of equipment affected by the license law; or satisfactory proof of completion of formal education or academic study embracing such equipment.

19

To be eligible for a Second Grade engineer's examination in any classification, applicant must have a Third Grade license and have had one year's practical experience as an engineer in such grade, or show experience of an equivalent amount and grade under some other jurisdiction.

20

To be eligible for a First Grade engineer's examination in any classification, applicant must have a Second Grade license and shall have served one year as Supervising or Chief Engineer in a plant requiring supervision by a Second Grade engineer, or have two years' practical experience as an operating engineer in a plant requiring supervision by a First Grade engineer, or show experience of an equivalent amount or grade under some other jurisdiction.

21

When an applicant's engineering experience and knowledge warrants, the Examining Engineer may determine the classification and grade of license most suitable.

22

All examinations for engineer's licenses shall be conducted in a written form and shall consist of as many questions and be of such nature as the Examiner shall consider appropriate for the license desired. The privilege of oral examination, to determine the experience of the applicant, his habits and

general fitness to perform the duties of an engineer or fireman, shall be allowed the Examiner.

23

Examination for fireman's license shall consist of such questions as the Examiner shall consider proper and shall pertain to the safe operation of boilers, boiler room appliances and boiler room machinery.

24

An applicant, unable to qualify by written examination, may, upon request, be orally examined, provided he signs a statement giving the valid reasons for said request, with his affidavit attached thereto.

25

Questions used in an examination shall not be copied by any applicant or retained by the applicant after examination, or taken from the presence of the Examiner during the examination. Violation of this rule will be sufficient cause for cancellation of application. SMOKING IS NOT PERMITTED IN EXAMINATION ROOM.

26

When a license applicant fails to pass an examination in a chosen classification and grade, the Examiner may, at his discretion, assign to him the classification and grade considered appropriate. Applicant may not be re-examined for a period of at least three months.

27

A license will be given a designation as Grade "A" when an average of 80% or more is attained on Grade "A" examination.

A license will be given a designation as Grade "B" when an average of 70% or more is attained on Grade "B" examination.

A license will be given a designation as Grade "C" when an average of 60% or more is attained on Grade "C" examination. No license will be granted on an average of less than 60%.

28

A fireman holding a "Fireman In Charge" license may act as Chief of a Boiler Plant of 500 boiler horsepower or less. He may assume charge of a shift, under the supervision of a properly licensed Chief Engineer, in installations not over 1,000 boiler horsepower. Where the plant capacity exceeds 1,000 boiler horsepower, he may act as fireman, under the direction of, and responsible to, a properly licensed Engineer in charge of his shift.

29

A licensed fireman may operate on a shift as assistant to a licensed engineer or a licensed Fireman In Charge.

30

An engineer holding a "C" or Third Grade license of the proper classification may act as Chief Engineer of any plant where the total capacity of the equipment involved does not exceed 1,000 boiler horsepower, 100 engine horsepower or 65 Tons ammonia refrigerating capacity. He may also act as operating engineer, under the supervision of a properly licensed Chief Engineer, in installations exceeding the above limits.

31

An engineer holding a "B" or Second Grade license of the proper classification may act as Chief

Engineer of any plant where the total capacity of the equipment involved does not exceed 3,000 boiler horsepower, 500 engine horsepower or 300 Tons ammonia refrigerating capacity. He may also act as operating engineer, under the supervision of a properly licensed Chief Engineer in installations exceeding the above limits.

32

An engineer holding an "A" or first Grade license of the proper classification may act as Chief Engineer in any plant.

33

Any person using fraudulent means to obtain a license shall be subject to prosecution. Any license acquired through such means shall be invalid.

34

Any license may be suspended or revoked for incompetence, neglect, intoxication while on duty, or for any other valid reason.

35

Any license or identification card shall be immediately revoked if, for any purpose, the holder thereof places it beyond his personal control.

36

All licenses shall expire unless renewed on or before the anniversary date of the original license. Changing of grade or addition of classification shall not change this anniversary date.

37

A LICENSE IS AUTOMATICALLY CANCELLED ON THE DATE OF ITS EXPIRATION. ANY OPERATING ENGINEER OR FIREMAN PERFORMING

THE DUTIES OF A LICENSED OPERATOR UNDER AN EXPIRED LICENSE IS SUBJECT TO THE PENALTY PROVISIONS UNDER R. S. 34:7-6, AS IS HIS EMPLOYER. LICENSE SHALL BE RENEWED WITHIN THIRTY DAYS PRIOR TO THE DATE OF ITS EXPIRATION.

38

Before returning license for renewal, tear off stub from license, and place in license frame. Return balance of license, with fee. Expired license will be stamped "Cancelled" and returned with new license.

39

An altered, defaced or otherwise mutilated license will be renewed only after review by the Bureau.

40

Employers shall immediately notify the Mechanical Engineering Bureau if for any reason of emergency it becomes necessary to employ an unlicensed engineer or boiler operator temporarily (not to exceed) fifteen days) and to again notify the Bureau when a licensed man is employed, giving the name, address, and license number of such employee.

41

A license issued after examination covering one or more classifications is valid in any plant where the class of engineering is within the scope of license issued.

42

All licenses must be framed and properly posted in the boiler or engine room, engineer's or plant

office, whichever is suitable, and must be available when authoritatively required. Penalty may be imposed for violation.

43

Identification cards are issued to engineers who hold licenses under classification 8 or 9.

44

FOR THE PURPOSE OF EXAMINATION OR INSPECTION OF ANY STEAM BOILER, PRESSURE VESSEL, REFRIGERATION SYSTEM, INTERNAL COMBUSTION ENGINE OR POWER PLANT, THE COMMISSIONER OF LABOR AND INDUSTRY OR ANY MEMBER OF THE MECHANICAL ENGINEERING BUREAU MAY ENTER SUCH PREMISES AT ALL REASONABLE HOURS.

45

Penalty Violations. Any person who shall violate any of the license rules or regulations shall be liable to such penalties as provided by law. An officer of a corporation shall be personally accountable for a violation by such corporation. Any manager, superintendent or other person in charge of any building or other place in which a violation occurs shall be liable for such violation. (Title 34, Chapter 7. Par. 6.)

STEAM BOILER CONSTRUCTION AND INSPECTION

1

R. S. 34:7-23 and 23.1 provides that all steam boilers shall conform to such regulations and standards as are from time to time adopted by the New Jersey Board of Boiler Rules.

2

All steam boilers equipped with safety valves set to operate at a pressure greater than 15 pounds per square inch gage, must be constructed and installed in accordance with New Jersey approved rules. To meet these requirements, the boiler must be constructed and installed in accordance with the American Society of Mechanical Engineers Power Boiler Code and stamped either New Jersey Standard, A. S. M. E. or National Board.

3

All steam boilers having ten or more square feet of heating surface and carrying a pressure of more than 15 psig. must be inspected internally and externally at least once each year.

4

(a) When an annual inspection is made by an insurance company, a certificate fee of two dollars ($2.00) will be collected by the inspector, for the State.

(b) When there is no insurance company inspection, the State will inspect the boiler, for which a charge will be made to cover actual cost of travel, plus the following inspection and certificate fee:

10 and not over 60 sq. ft. of heating surface	$3.00
Over 60 and not over 1,000 sq. ft. of heating surface	6.00
Over 1,000 sq. ft. of heating surface.	12.00

5

The steam boiler to be inspected must be empty, clean, cool and ready for the inspector. The inspector's recommendations must be complied with promptly.

6

Repairs to a high pressure steam boiler or any of its connected piping must be satisfactory to an authorized boiler inspector employed by an insurance company or the State and performed under his guidance.

7

Every boiler approved for use in the State is assigned a Registration Number, which may be found in the upper left hand corner of the Boiler Certificate.

At the direction of the inspector of the boiler, this number must be stamped directly on the boiler drum, near the manufacturer's stamping, in letters at least ¼" high, or as otherwise directed. This number must also be attached to the front of the boiler, in such a manner as to be plainly visible.

8

The State Boiler Inspection Certificate must be properly framed and posted in the boiler or engine room, engineer's or plant office, whichever is suitable, providing the certificate is available when authoritatively required.

9

Steam Boiler Blowdown Tanks

The construction and installation of steam boiler blowdown receivers are regulated by the Board of Boiler, Air and Other Pressure Vessel Rules. Copies of rules affecting blowdown receivers may be obtained upon application.

10

Penalty Violations. The owner of a steam boiler plant who shall use it or allow it to be used in violation of any lawful rule or regulation shall be subject to such penalties as provided by law. (Title 34, Chapter 7, Par. 26.)

REFRIGERATION INSTALLATION AND INSPECTION

1

Refrigerating systems using ammonia or ethyl chloride, or over three Tons refrigerating capacity, must be inspected annually by an authorized State or insurance company inspector. (R. S. 34:7-25.)

2

It shall be the responsibility of the operator and inspector to carefully check for indication of irregular, faulty or hazardous conditions. This inspection shall include the liquid receiver, condenser, all safety valves and their discharge points, gages, controls and all other items which might be considered potentially critical.

3

The inspector should check operators' licenses where such are required, also State Registration Certificate, and make note of same on inspection report.

4

A safety valve of the required size must be installed on the compressor discharge line, located between the compressor outlet port and the discharge shut-off valve; this can discharge into the suction side.

5

Safety valves must also be installed to relieve from the gas space of the liquid receiver, condenser and other pressure vessels in the system.

6

These safety valves must discharge to the atmosphere at a safe point and through a diffuser. Where discharge to the atmosphere is impracticable or hazardous to the immediate neighborhood, said discharge may be into a receptacle through which the refrigerant can be safely disposed of.

7

Ammonia or ethyl chloride refrigerating plants or systems shall be installed in accordance with the accepted requirements of the American Standard Safety Code for Mechanical Refrigeration, as published by the American Society of Refrigerating Engineers.

8

All pressure vessels used for refrigerating systems must meet the requirements of unfired pressure vessel regulations as shown on following pages.

9

Penalty Violations. The owner of a refrigerating plant who shall use it or allow it to be used in violation of any lawful rule or regulation shall be subject to such penalties as provided by law. (Title 34, Chapter 7, Par. 26.)

SAFETY VALVE REQUIREMENTS FOR AMMONIA REFRIGERATION

The minimum required rated discharge capacity of safety valves for ammonia-containing vessels shall be determined by the following:

C RL

Where C minimum required discharge capacity of the relief device in lb. of air per minute.

R outside radius of the vessel in feet.

L length of the vessel in feet.

Example:

Determine the required discharge capacity of a safety valve to protect an ammonia receiver 3 feet diameter by 10 feet long.

C RL

C 1.5 x 10

C 15.0 lbs. of air per minute.

A safety valve rated at a capacity of 900 lbs. of air per hour must be provided.

PRESSURE VESSELS, FIRED AND UNFIRED

Amending and Supplementing Revision of
May 1, 1955
Originally Approved June 1, 1931

The following Pressure Vessel Rules and Regulations are issued pursuant to the authority vested in the Commissioner of Labor and Industry, his deputies, boards and commissions, under Title 34 of the Revised Statutes:

1. *Scope.* These rules and regulations govern the construction, inspection, installation, repair and alteration of pressure vessels used as containers of liquids or gases (air, steam or other).

2. *Classification.* Pressure vessels subject to these rules must meet or exceed the minimum requirements of their specific category, designated as CLASS I, CLASS II, CLASS III or CLASS IV.

   Class 1. Pressure vessels designated as CLASS 1 must conform in all respects to the pertinent sections of the A.S.M.E. Boiler & Pressure Vessel Code as formulated by the American Society of Mechanical Engineers and valid at the time of construction. All shop inspections of CLASS 1 vessels must be conducted by a qualified inspector who shall satisfy the requirements of the Code and shall be in possession of a valid National Board of Boiler and Pressure Vessel Inspectors' Commission ALL CLASS 1 pressure vessels must be stamped and identidentified as prescribed by the Code. CLASS I pressure vessels should also be stamped as designated by the National Board.

Class II. Existing pressure vessels constructed in accordance with the rules of the API-ASME Code and registered with the State.

Class III. Pressure vessels designated as CLASS III may fall into either of three groups, identified as NEW JERSEY STANDARD, NEW JERSEY SPECIAL and NEW JERSEY APPROVED.

New Jersey Standard. Constructed in accordance with the provisions of the latest edition of the A.S.M.E. Code Rules approved by the New Jersey Board of Boiler and Other Pressure Vessel Rules, inspected by a New Jersey Authorized Inspector and subsequently stamped NEW JERSEY STANDARD.

New Jersey Special. Constructed as far as possible in accordance with the provisions of the A.S.M.E. Code Rules, deviating only in the absence of applicable provisions. Drawings and calculations, fully descriptive of such construction, with Code inapplicability noted, must be approved by the Bureau prior to construction. All such vessels shall be inspected by a New Jersey Authorized Inspector, in accordance with whatever test provisions the Bureau shall consider appropriate, following which the pressure vessel may be approved and stamped NEW JERSEY SPECIAL.

New Jersey Approved. Existing vessels which have been constructed contrary to the provisions of the A.S.M.E. Code or API-ASME Code. Such vessel may be adjudged eligible for such classification after appropriate evidence has been considered. Complete inspection and thorough testing to the satisfaction of a specifically assigned New Jersey Authorized Inspector is manda-

tory, as may be periodic re-inspection. If acceptable, such vessels may be stamped NEW JERSEY APPROVED.

Class IV. Pressure vessels designated as CLASS IV are "User-Inspected", where applicable, warranted and expressly permitted by the Mechanical Engineering Bureau. To qualify as such, a "User-Inspector" must be continuously employed as a full-time inspector by the inspection division of a user maintaining an adequate pressure vessel design and inspection section. A user-inspector must be approved by and registered with the Bureau, which reserves the right to withdraw such approval at its absolute discretion. The Bureau shall also be furnished upon request such copies of design, material specification calculations and allied data as available or needed in such manner as it may require, and shall retain its prerogative of such supervision over user-inspections, joint inspections and/or re-inspections as it may deem necessary. Such vessels may be constructed and stamped in accordance with the "User-Inspection" provisions of the A.S.M.E. Code.

3. *Inspection Fees.* Fees in the amount of six dollars ($6.00) per vessel, with a minimum fee of twenty-five dollars ($25.00) per day or part thereof are charged for State Inspection Service. To this must be added the inspector's transportation charges.

4. *State Registration of National Board or State Inspected Vessels.* No original registration or registration fee required since registration is forwarded by the National Board or the State Inspector.

5. *Registration Fees.* In instances other than those of Item 4, manufacturer's data reports in duplicate, with a fee of two dollars ($2.00)

for each vessel, must be forwarded to the Bureau for approval and registration. One copy, when approved, will be returned to the user of the vessel. Where reports are not filed, the vessel will be subject to inspection and State Inspection fees.

6. *Pressure Vessel Repairs and Alterations.* Pressure vessel repairs and alterations shall be performed according to the applicable rules, under the guidance of a National Board Inspector, a New Jersey Authorized Inspector or a User Inspector as defined under paragraph 2 CLASS IV.

EXEMPTIONS

1. Pressure vessels having an internal or external operating pressure not exceeding fifteen (15) pounds per square inch, irrespective of size; or having an inside diameter not exceeding six (6) inches, irrespective of pressure.

2. Unfired pressure vessels in which steam is not generated, and which does not exceed the following volume and pressure limits, may be exempted from shop inspection by qualified inspectors, provided that they comply in all other respects with the requirements of these rules:

   (a) 5 cubic feet in volume and 250 pounds per square inch design pressure.

   (b) 1½ cubic feet in volume with no limit on pressure.

   Vessels exempted from Code inspection by this rule shall be stamped with the "UM" symbol.

3. Vessels subject to Federal control.

4. Interstate Commerce Commission stamped vessels of five (5) cubic feet capacity and under, used within the State under Interstate Commerce Commission Regulations.

5. Interstate Commerce Commission stamped vessels of over five (5) cubic feet capacity, and used in inter-state service.

6. Vessels for containing water at a temperature not exceeding 250° Fahrenheit.

7. Vessels with a nominal water-containing capacity of one hundred and twenty (120) gallons or less for containing water under pressure, including those containing air, the compression of which serves only as a cushion.

PENALTY VIOLATIONS. Any person who shall violate the pressure vessel rules or regulations shall be liable to such penalties as provided by law (Title 34, Chapter 7, Par. 23–1).

Effective March 10, 1958