

**GUIDELINES FOR
LOGBOOKS
COMPLIANCE TO BOILER
REGULATIONS N.J.A.C. 12:90**

Department of Labor and Workforce Development

Labor Standards & Safety Enforcement

Division of Public Safety

and

Occupational Safety & Health

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**GUIDELINES FOR LOGS – HIGH AND LOW PRESSURE BOILER OPERATION
IN ACCORDANCE WITH N.J.A.C. 12:90
EXCERPTS OF THE REQUIREMENTS FOUND AT N.J.A.C. 12:90-3.10**

- (a) Each low pressure boiler operator shall not jeopardize the safe operation of a low pressure heating boiler and shall remain on the premises.
- (b) The length of time that the licensed person can be away from the equipment varies according to its nature, size and load conditions. At a minimum, the operator shall monitor the conditions of the low pressure boiler plant at least once every two hours, consistent with the requirements set forth in N.J.A.C. 12:90-3.5.
- (c) A boiler operator's log shall be maintained in each plant containing over 100 horsepower. Every operator on the shift shall review the log and, at the end of each shift, shall sign the log. All logs shall include the date, name of operator(s) on duty, and time of relief. Any personnel who are training to obtain their licenses under the requirements of N.J.A.C. 12:90-8.4 shall include within the log the actual time spent as a trainee. When the operator of a low pressure plant is not in the boiler room, as permitted above, the operator shall indicate in the log periodic tours of the boiler plant as required.
 - 1. High pressure boiler operator logs shall contain, at a minimum, all necessary information as contained within the equipment manufacturer's "Operating and Maintenance Manual" and all reference material specifically used for high pressure boiler operation, service and maintenance to ensure daily safe operation of the boiler, piping, accessories and plant equipment in addition to the minimum information as outlined in ASME Section VII, Recommended Guidelines for the Care and Operation of Power Boilers, paragraph 6.632.
 - 2. Low pressure boiler operator logs shall contain, at a minimum, the information as outlined in ASME Section VI, Recommended Guidelines for the Care and Operation of Heating Boilers, paragraph 6.09(b)(c).
 - 3. The boiler operator's logbook shall be kept in a hardbound book of the consecutively numbered type and none shall be removed under any circumstances. In lieu of a hardbound book, the log may be kept on electronic media recording devices and be accessible for review or printing upon request.
 - 4. Other pertinent data referenced by the above noted ASME Guidelines means information that would impact the normal safe operation of a plant.
 - A. The names of the Chief Engineer, shift engineers and any other permanent boiler room staff should be recorded together with the time and period of duration of the shift.
 - B. At the start of each shift, the names of the shift engineer and other staff commencing duty should be entered, together with the time and period of duration of the shift.
 - C. All personnel training for a license shall be recorded in the logbook by their first and last name. At no time is the trainee allowed to be on shift alone. The attending licensed operator should always indicate in the logbook the duration of the training and must identify the person.
 - D. The entry of persons to the boiler room (other than the regular operating staff) must be recorded together with the purpose of them being there.

- E. Any special instructions from the Chief Engineer (if applicable) or responsible management person regarding maintenance, repair work or special operational procedures may be entered into a separate daily shift instructions document. This document must be signed by the Chief Engineer or manager to validate the instructions.
 - F. Compliance with oral or written instructions, upon completion, must be recorded in the logbook.
 - G. Any of the following typical functions are appropriate for recording in the logbook.
 - a) blowdown of boiler
 - b) blowdown of water column
 - c) testing of low level control
 - d) testing of safety valves
 - e) operation of sootblowers
 - f) water sampling
 - g) addition of chemicals
 - h) tests being performed on modulating or on/off controls by...
 - i) any other typical function, applicable to the particular boiler, controls or auxiliaries not mentioned here.
 - H. Any malfunction (trip or shutdown) of any item of equipment or control, mechanical, electrical, or electronic, must be documented in the logbook with the time of occurrence, together with the corrective action taken.
 - I. Any mechanical or electrical repairs initiated and/or completed must be documented and recorded in the logbook.
 - J. Any work performed outside the boiler or refrigeration plant and time spent, include in the logbook.
- (d) Shift Change – It is imperative that every operator be relieved properly. The operator relief meeting at a minimum must include the operational conditions and any abnormal occurrences that have occurred or that still exist. If any valve positions have changed from their normal condition, the logbook and your oral discussion with the relief must convey this information.
 - (e) At the end of the shift, the shift engineer or operator as applicable, must properly document the shift activity that includes listing and recording the trainees putting in time.
 - (f) Falsification of the logbook is a serious offense that could cause an operator to lose their license if the action is negligent or deliberate.

SCOPE OF BOILER LOGBOOK PROGRAM

In all cases, there are minimum tasks and functions for an operator to perform in a boiler plant that is dependent upon the complexity, size and condition of the equipment. The manager in charge may or may not be a licensed operator but in all cases the rule of thumb to understand is that the entire boiler room is the “realm” of the operator and any anomalies should be reported within the operator’s logbook entry. Management practices and policies should always ensure safety is fully addressed in the operation of the boiler plant. All operators should qualify prior to giving them the responsibility of operating and monitoring such potentially hazardous equipment.



NOTE: It must be understood, the actual operator logbook entry is not just a list of readings, though in some cases readings might be a part of the logbook entry. This depends upon the type or size of the logbook provided by the owners and/or management of the facility. See the example logbook entry section on the last page of this guideline.

1. The logbook must record and document the three-month training period in accordance with N.J.A.C. 12:90-3.10.
2. Entries in the logbook should include details of the existing operations (naturally occurring) and indicate all observations that are abnormal or unusual in their occurrence.
3. The logbook should report on the mechanical and operating conditions found at the time of observation.
4. Rounds in the boiler plant (room) should be a top to bottom, front to rear assessment of the boiler and the controls and safety devices that are an integral part of its functions.
5. Important - The two-hour period established in the regulation is a minimum inspection period. However, plant environment, organizational safety practices or requirements, or management procedure may dictate that more frequent checks be made.
6. It is common practice for an operator to put into the logbook all issues and items specific to operating the facility. Therefore, if a low-pressure operator cannot make it back within the designated period established in the regulations, the operator should when possible, have another trained and licensed operator make the check of the boiler plant. If no operator is present, then the licensed operator should take whatever action is necessary to expedite returning to the equipment entrusted to his or her care.
7. The operator, upon returning to the boiler room must indicate in the logbook all time away from the boiler plant. The logbook entry should be clear and indicate the reason why a check could not be made and the reason the inspection interval was exceeded. Any work assignments or instruction from management that the operator received specific to the boiler plant should be indicated within the logbook as such, and if an emergency arises, the same would apply by indicating the nature of the emergency and duration of the event.
8. The Bureau has not historically held an operator liable for an incident if an inspection or logbook entry is missed, provided the operator is not willfully negligent. By the licensed operator completing the operator's logbook, it can serve as a protection; but only if the information contained within it is factual, correct, and accurate. Thus, an operator must follow the regulations and complete an accurate logbook at all times.

TYPICAL DAILY READINGS TO OBSERVE AND REPORT

Daily Instrument Readings are contained as a part of or indicated on a separate record, depending upon the complexity of the mandatory boiler operator's logbook.



The following instrument readings, as appropriate to the specific boiler system, need to be taken daily for low-pressure heating boilers and at least once per eight-hour shift for high-pressure boilers or as required by the owner, manager or other responsible party. These readings must be recorded either in the boiler logbook if the arrangement of the logbook accommodates them, otherwise if readings are extensive in nature, a separate logbook of readings must be maintained.

Note: It is very important that the boiler logbook and readings be kept in a consistent format, in order for trends to be perceived and followed with preventive or predictive action. Standard forms are available for this purpose; however, the log may be more useful if the log form is customized for the particular installation by the owner.

The readings report should be on the testing interval as recommended by the manufacturer of the critical safety device or controls. Create a calibration and regular proof test interval for all critical safety devices and components.

GENERAL

- Air compressor, control pressure (psig)
- Outdoor air temperature (degrees F)
- City water supply pressure (psig)

BOILER

- Boiler(s) in service
- Fuel in use
- Operating time (hours)
- Operating cycles (number)
- Amount of fuel on hand
- Amount of fuel consumed
- Boiler water level (normal, low, high)
- Firing level (rate)
- Flame condition (observed)
- Boiler water temperature, hot water (degrees F)
- Stack temperature, net (degrees F)

GAS FUEL

- Pilot gas pressure (inches WC)
- Burner gas pressure (ounces/square inch or psig)
- Gas used (cubic feet)

OIL FUEL

- Oil pump in service
- Oil consumed (gallons)
- Vacuum at oil pump (inches Hg)
- Oil pressure at pump (psig)
- Oil pressure at burner (psig)
- Oil pressure at regulating valve (psig)
- Atomizing medium pressure, air, steam (psig)

CONDENSATE SYSTEM (steam boilers)

- Boiler feed pump in service
- Condensate return temperature (degrees F)
- Water level in condensate tank (normal, low, high)
- Make up water rate (gallons)

FORCED HOT WATER CIRCULATING SYSTEM

- Circulating pumps in service
- Return water temperature (degrees F)
- Water level in expansion tank (normal, high, low)

BOILER WATER TREATMENT

- Level of chemicals in treatment tank
- Treatment pump in service (low, normal)
- Boiler water sample taken

MAINTENANCE OR REPAIR OPERATIONS

- When maintenance action is taken in the boiler room or plant these operations should be recorded in the boiler operator's logbook as well as documented and recorded in the maintenance log. The operator's log details what is being done, identifying the item and who is working on it. The maintenance log details the specifics of the equipment and the work being done to fix problem (scope).

SUGGESTED MAINTENANCE LOG PROGRAM

Note: Each plant is different; the following is only for example. A responsible Plant Engineer, Chief Engineer, Operations Manager, Maintenance Manager, Director or Facilities Supervisor, etc., should establish a log with at least the minimum below. In most cases more is needed to provide a true representation of the program and its objectives.

The following maintenance items, as appropriate to the specific boiler system, need to be considered for implementation on a regular basis (e.g., daily, weekly, monthly, semiannually, and annually). A checklist of the items should be incorporated into a maintenance log with provisions for checking off the item for the appropriate period.

A separate log sheet is suggested for each period. The log sheets can be filed in a loose-leaf binder, and should be retained as a permanent maintenance record. The log sheets can be used as a handy check-off system when establishing a facility maintenance program. In all cases, the equipment manufacturer's recommendations should be followed.

DAILY

- Blow down and test low water cutoffs of steam boilers (once per shift for high pressure)
- Blow down gage glasses (steam)
- Blow down make up feeder (low pressure steam)
- Blow down boiler (steam)
- Check boiler control linkage
- Check boiler and system for leaks
- Check burner flame

WEEKLY

- Check compressor(s) lubricating oil level (control and atomizing)
- Check flame signal strength for both pilot and main flame, and record readings
- Check flame failure cutoff and timing
- Check pilot and main flame fuel shutoff valve closing
- Check igniter and burner operation
- Check level in chemical treatment tank

SUGGESTED MAINTENANCE LOG PROGRAM (continued)

MONTHLY

- Check compressor(s) air filter, and clean or replace as required
- Check boiler water treatment test results received from treatment company, adjust treatment as required
- Lubricate motor and equipment bearings
- Test fan and air pressure interlocks
- Check main burner fuel safety shutoff valves for leakage
- Check low fire start interlock
- Check high pressure / temperature interlocks
- Test low water cutoffs (hot water)
- For oil - test pressure and temperature interlocks
- For gas - test high and low gas pressure interlocks
- Manually lift safety/safety relief valves and check operation

SEMIANNUALLY

- Inspect burner components
- Check flame failure system components
- Check piping and wiring of all interlocks and shutoff valves
- Recalibrate all indicating and recording gages and instruments
- Perform a slow drain test for low water cutoffs (steam)
- Check combustion control system
- For oil - check atomizers and strainers
- Test boiler safety/safety relief valves in accordance with *ASME Boiler and Pressure Vessel Code, CSD-1 and applicable ASME Code Sections VI and VII, and the National Board Inspection Code (NBIC-ANSI-NB 23, NFPA 85)*.
- When necessary replace safety relief valves with the proper rating and capacity in accordance with manufacturer's specifications.

SUGGESTED MAINTENANCE LOG PROGRAM (continued)

ANNUALLY

- Perform the SEMIANNUAL maintenance procedures
- Check all equipment coils and diaphragms
- Perform a pilot turndown test
- Recondition or replace low water cutoff
- For gas - check drip leg and gas strainer
- Clean boiler firesides
- Drain boiler, open manholes and hand holes, and clean watersides
- Have boiler inspected by a commissioned inspector
- Clean burner and fans
- Replace gaskets
- Leak-test all fuel valves
- Test operation of all controls and safety devices
- Have fuel-burning system adjusted using combustion test instruments



AFTER EACH PERIOD

- Make a record of all maintenance and parts replacements in the maintenance log.

MAINTENANCE AND SERVICE

- It is suggested that the equipment owner ensure that the service and/or maintenance company meets the details of the Bureau of Boiler and Pressure Vessel Compliance (*hereafter termed* BB&PVC) adopted codes and standards to ensure compliance. In addition, the service or repair should be capable of complying and providing service to a minimum of the following:
 1. Document for the owner specific testing made on controls and safety devices in accordance to the manufacturer's specifications and the adopted codes and standards of the BB&PVC and;
 2. Have necessary testing and calibration equipment to perform "proof testing" of the controls and safety devices and;
 3. Comply with ASME CSD-1, 2001 edition; reference only the section on testing, logbooks and operational checks and;
 4. Maintain copies of and follow the ASME Code Sections VI and VII, 2001 or current edition, Rules for the Care and Operation of Heating Boilers, Recommended Guidelines for the Care of Power Boilers and;
 5. Must be able to provide service in accordance to the recommendations and specifications of the original equipment manufacturer (OEM) or equivalent. When necessary, obsolete equipment should be replaced to ensure safety and reliability.
 6. Replacement controls and safety devices must be purchased from companies that are certified and recognized by national testing standards (UL, FM Approved).

RESPONSIBILITY OF OWNERS

- (a) The owners of equipment that requires a licensed operator shall employ and designate an attending licensed operator(s) (ALO). This designated operator or ALO shall be available at the plant location, in accordance with N.J.A.C. 12:90-3.10. The ALO shall be capable of performing the duties of operations of the plant and systems in accordance with these regulations. The owner shall ensure that the operator(s) is properly and sufficiently trained in the proper functioning and operation of the plant and/or system equipment they are responsible to operate, use and maintain in accordance with the Act and these regulations.

- (b) The owners of equipment requiring an ALO as indicated in (a) above, shall establish operational requirements to ensure that the structural and mechanical integrity of the equipment is maintained. This includes ensuring all operational and maintenance checks are being performed in the plant on all equipment and accessories that directly or indirectly have an impact on the operation of the boiler, pressure vessel or refrigeration equipment. These operational maintenance checks shall only be necessary on equipment rated over 100 boiler horsepower, or 1,000 square feet of heating surface or 4,000,000 Btu/hr input or 1,000 kW regardless of the pressure or temperature conditions.

- (c) The operational and maintenance checks and the frequency of these checks shall, at a minimum, be determined and in accordance with the specifications established by the manufacturer of the equipment and/or device, pertinent sections of ASME CSD-1 and other appropriate sections of the Codes and Standards adopted by reference.

- (d) The designated operational and maintenance checks shall be as prescribed by, but not be limited to, the proof testing established by the manufacturers and any additional requirement established by ASME CSD-1 and N.J.A.C. 12:90 or as prescribed by the Examining Board.

- (e) Owners of equipment must ensure that boiler equipment and its integral systems are properly maintained. The owner shall verify that the electrical components, controls and safety devices are, at a minimum, properly tested and maintained in accordance with the specifications of the original equipment manufacturer and these regulations.

- (f) Owners must maintain records of equipment maintenance, repair and service calls. This includes, but shall not be limited to, the installation, setup, testing, calibration, service, repair or replacement of the equipment or the controls and safety devices. All such records shall be made available whenever they

are requested by the Examining Board or their designees. Such records shall include, but not be limited to, the following information:

1. Maintenance history of the equipment and devices; and
2. Documentation of operational checks, maintenance, repair, tests and service logs.



(g) An owner shall ensure that if the intended use of a boiler, pressure vessel or refrigeration system/plant changes or is no longer to be used, then the specific boiler, pressure vessel and refrigeration system/plant must be removed from service by performing a minimum of the following:

1. Disconnecting all energy sources (fuel, electrical, air and any other potential energy source); and
2. Shutting off all valves and interconnected piping; and
3. Removal, capping or blanking off other external connections or fittings that might be a path for other external energy sources; and
4. Documenting all the work performed.

(h) The owner shall not allow any type of installation, repair, alteration or upgrade of the boiler, pressure vessel, or refrigeration system/plant to be made that changes the design, without determining if such changes are allowed by these regulations, the manufacturer, the National Board Inspection Code (NBIC), or any other Code and Standard adopted by reference by the BB&PVC or as prescribed by the Examining Board.

(i) The owner shall not allow any boiler, pressure vessel or refrigeration plant/system change to be made that might directly or indirectly affect the design of the boiler, pressure vessel or refrigeration plant/system without complying with the required code as adopted by reference by the BB&PVC. The owner shall not allow any change that might compromise the mechanical integrity of the plant/system.

(j) The owner shall assure that all system modifications, alterations and/or maintenance/services performed on the equipment are documented and retained for the life of the equipment.

LOGBOOK EXAMPLE

THIS IS AN EXAMPLE OF THE INSIDE FRONT COVER OF A HARDBOUND LOGBOOK

No person shall deface, damage, destroy or, without permission of the user, remove this logbook from the plant. The Chief Engineer shall ensure that this logbook is kept accessible in the plant for at least three years after the last entry herein and shall produce this logbook for examination upon the request of an inspector.

Signatures of Boiler Room Staff

This logbook was Opened on MM/DD/YYYY

By: _____

Name (Printed)	Signature	Position	Date

BOILER OPERATOR'S LOGBOOK
EXAMPLE OF OPERATOR'S DAILY LOG ENTRIES

Sign In: Senior Mann

Trainee: Carl Knew

7:00am - Took over watch and made a round of boiler room; noted a strong smell of gas upon entering the north entrance; all operational conditions appear to be satisfactory. Blowdown performed on Boiler # 1 & #2. Took fuel oil tank sounding; noted same on fuel and readings sheet. Gas leak could not be detected upon checking piping; smell of gas not too strong as noted in boiler room upon entering; noted possible leak to supervisor at 7:15 a.m.

Carl Knew in plant for hands-on training at 7 am.

8:15am - Responding to a call from room "XXX" which has no heat. Reported same to maintenance (*or if person maintenance they would write - found "XXX" facility or room without heat; isolated system and repaired.*) or unable to repair at present, completed work order or request form etc. Returned to boiler room at 8:45 am and made operational checks. All conditions satisfactory, no smell of gas at present. Boiler is running on load demand. Low water fuel cutoff test performed by opening blow-off valve on water column; Test okay, burner tripped, reset and post-purged and restarted as required. Observed purge and light off, OK.

9:15am - Out of boiler room making a round of premises or facility; comfort control and heating system check OK, note that setback timer is off by 90 minutes. Is this correct? Noted same to supervisor by radio (*or by telephone, whichever is applicable*).

9:30am - Responding to call of water leak in hallway from ceiling. Found packing gland loose on a steam valve; screwed down on gland and leak stopped. Completed a work request to have valve packed or replaced.

10:30am - Boiler alarm signal received, returned to boiler room. Found low water trip alarm indication. According to burner control system or "Fire-eye or Honeywell LCD display indicated LOCKOUT trip at 10:20 am". Verified water level normal, manually reset, boiler restarted OK. Steam pressure at 2 psi now. Observed purge to main flame start. Verified operation of condensate system and MU (*Make-Up*) water. Unable to determine reason for the low water at present. All conditions appear to be normal. Reset control and restarted as instructed by supervisor.

11:45am - Round made in boiler plant, completed inspection checklist - conditions appear to be normal.

12:00pm - Break for lunch.

1:05pm - Boiler put on stand-by¹. Outside temperature is above normal at present time. Notified supervisor (*or whoever would have to be advised in this case*).

2:45pm - Made a round of boiler room - no unusual conditions detected.

3:00pm - Signed out - relieved by Charlie Boy.

Signature: Senior Mann

Trainee: Carl Knew

Trainee Hours: 5 hours by SM

¹ Management procedures may vary, and this operation usually depends upon the season and use of equipment.

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