

RULES MADE UNDER THE INDIAN BOILERS ACT. 1923

1. - Preliminary

1. Definitions. – In these rules unless there is anything repugnant in the subject or context--

- (a) "The Act" means the Indian Boilers Act, 1923.
- (b) "Section" means a section of the Act.
- (c) "Regulation" means a regulation framed by the Government of India under section 28 of the act.
- (d) "The Director of Industries" means the officer appointed by the (State Government) in this behalf.

(I-A. Extent the shall apply to the territories which immediately before 1st November, 1956, were comprised in the State of Punjab and Patiala and East Punjab States Union).

2. Payment of fees. All fees payable under the Act shall be deposited by the payer in a Government Treasury or the (State Bank of India). Applications, under sections 7 and 8 of the Act to which the Treasury or Bank receipt for payment is affixed, shall be deemed to be accompanied by the prescribed fee.

II- Duties of the Chief Inspector.

3. Control by the Director of Industries.- The Chief Inspector shall work under the administrative control of the Director of Industries, and shall submit to him.

- (a) an annual report of the administration of the Act;
- (b) such other reports and returns as may be called for Exceptional cases, which are not covered by the regulations or rules should be reported to the Director of Industries.

4. Duty of general Control. The Chief Inspector is vested with all the powers of an Inspector under the Act. In areas for which Inspectors have been appointed by the (State Government) under sub-section (1) of section 5 of the Act, his main duty consists in supervising and controlling the work of such Inspectors, and he should actually inspector examine Boilers only in exceptional cases, or where he considers that the work of an Inspector requires personal check. In other areas he will perform in addition to his own duties, the duties of an Inspector under the Act.

5. Specific duties. – The Chief Inspector Shall--

- a. Personal check the registration and measurements of all newly registered boilers, for the initial working pressure on the basis of part I or the regulations and enter under his own signature all orders required by section 7;

"Vide Punjab Government notification No. 1620, dated 31st 1926. ' Substituted by the A.O. 1950, for "Provincial Government " which was substituted by the Government of India (Adaptation of Indian Laws) Order, 1937 for "Local Government".

' Inserted by Punjab Government notification No. 5771-VII-DS-Lab.- 60/508, dated 12th January 1981.
'Substituted by Parliament Act No. 33 of 1950 of 1955, section 58.

- b. enter under his own signature any subsequent entries required in the registration book
- c. in the case of any boiler, the transfer of which has been reported under clause (b) of section 6, obtain from the [State] in which it was originally registered the registration book of such boiler;
- d. receive applications for registration or inspection under section 7 or 8, proposals for repairs, alterations or renewals under section 12 and reports of accidents under section 18;
- e. prepare the programme of all Inspector subordinate to him with due regard to the convenience of owners generally;

N.B. – Inspection of boilers in seasonal factories should in all cases be fixed during the off season.

- (f) examine and countersign the Inspectors' Memorandum of Inspection Book of each boiler after each inspection;
- (g) examine and pass orders on the diaries and returns of Inspectors; pass orders in all cases in which an Inspector proposes to increase or reduce the pressure allowed for any boiler under section 8 or to revoke, cancel or refuse to renew the certificate of a boiler under section 11 or to order important repairs, structural alterations or renewals in a boiler under section 12;
- (h) pass orders in all cases in which it is reported that after due notice the boiler has not been properly prepared for inspection;
- (i) decide all appeals against the order of an Inspector under section 19;
- (k) Sanction prosecutions under the Act; and
- (l) enquire into serious accidents to boilers.

6. Instructions to owners. – It shall be the duty of the Chief Inspector to advise owners as regards the maintenance, working and cleaning of boilers and to issue a set of instructions on the lines indicated in Appendix A. The instructions should be conspicuously displayed in each boiler house.

7. Register to be kept. – The Chief Inspector shall keep in his office -

- a. a register in form A of all boilers registered in the [State] or the registration book and memorandum of inspection book of which have been transferred from another [State];
- b. the registration book and memorandum of inspection book all boilers borne on his register;
- c. a register of appeals;
- d. a registrar of accidents;
- e. a register of registration and inspection fees received

‘Substituted by the A.O. 1950, for “Province.”

18. Control of bill. – The Chief Inspector of Boilers shall be the controlling or countersigning authority in respect of all contingent bills and of T.A. bills of officers other than Gazetted Officers, subordinate to him. In the case of T.A. bills of Gazetted Officers, the Director of Industries, Punjab, shall be the controlling or countersigning authority.]

III – Duties of Inspectors

9. Subordinate to Chief Inspector – Inspectors shall be directly subordinate to and under the control of the Chief Inspector.

10. General duties of Inspectors – The main duties of the Inspector as laid down in the Act are the inspection and examination of boiler and steam pipes. Inspections shall be carried out in accordance with part II of the regulations and parts IV and V of these rules which must be very closely observed.

11. Search for unregistered boilers. – In addition to the inspection and examination of boilers it is the duty of Inspectors to search for unregistered or uncertificated boilers at or near the places they visit, and to see that certificated boilers are worked in accordance with the terms of their certificates.

12. Advice to be given the owners.– At the time of inspection Inspectors should advise the owner and the person- in-charge of the boiler on the management and upkeep of the boiler with special reference to the amount of cleaning required in view of the quality of water used and should also impress upon them the usefulness of the instructions issued by the Chief Inspector.

13. Specific duties. – Inspectors shall -

- (a) maintain a memorandum of Inspection Book for each boiler they inspect and submit it to the Chief Inspector for examination and countersignature after each inspection;
- (b) keep a diary showing places visited, boilers registered or inspected, with fees paid thereon, variations from the programme, and any other important particulars. This diary should be sent to the Chief Inspector every week for examination.
- (c) enquire into accidents to boilers or steam pipes and submit reports thereon to the Chief Inspector;
- (d) report to the Chief Inspector cases of previously unreported accidents discovered at the time of inspection.
- (e) submit for the orders of the Chief Inspector –
 - (i) The memorandum of Inspection Book of all boilers proposed for registration under section 7.

- (ii) Proposals for increasing or decreasing the pressure of a boiler after inspection under section 8.
- (iii) Proposals for necessary repairs, structural alterations or renewals to a boiler under section 8 or 12.
- (iv) Proposals for revoking, canceling or refusing to renew a certificate under section 8 or 11.
- (v) Reports when boilers have not been properly prepared for inspection under section 14.
- (vi) Proposal for prosecutions under the Act.

14. Inspections at special times. – (a) No examination of a boiler shall be made by an Inspector for the purpose of registering or issuing a certificate for a boiler on a Sunday, a gazetted holiday, or between the hours of sunset and sunrise without the specific order of the Chief Inspector in each case. In such cases a double fee may be charged half of which may be paid to the Inspector.

(b) If an owner does not apply for the renewal of his certificates under sections 8 and 10 until after the expiry of the specified period, he shall state his reasons for the delay, and the Inspector shall thereafter fix a convenient date for the inspection of the boiler. If the Chief Inspector is not satisfied with the reasons given for the delay in putting in the application he may direct that a double fee shall be charged for such inspection.

¹(c) (1). In addition to the ordinary Inspection fee leviable under the rules, the Chief Inspector of Boilers may direct that an owner of a boiler shall pay the travelling expenses of an Inspector equivalent to the travelling allowance admissible under the rules, in cases where the boiler of such owner is not ready for inspection on the date specified for inspection, for every additional visit made for the completion of inspection.

(2) The Inspector's travelling allowance may also be charged for the inspection of a boiler in isolated areas in addition to the fee prescribed under the rules.

15. Attendance during hearing of appeals. – If the Chief Inspector so directs, Inspectors shall attend before the Chief Inspector or the appellate authority, as the case may be, during the hearing of appeals with regard to boilers which they have inspected.

IV. – Instructions for Registration

16. Importance of registration – Technical regulations for the registration of boilers and the scale of fees for registration are prescribed in part II of the Regulations. The details of measurement recorded at the time of registration constitute a permanent record for the boilers and determine the original pressure at which the boiler is allowed to work. It is accordingly essential that the work should be done with the greatest care and precision. ¹

³ Ordered by Punjab Government Notification No. 29210

17. Receipt of applications. – Applications for registration shall be made under sub-section (1) of section 7 to the Chief Inspector, and shall be accompanied under rule 2 by a receipt for the prescribed fee. No application shall be accepted without the receipt. No boiler shall be registered if on measurement the fee is found to be deficient until the deficit has been paid. Any excess payment will be refunded at the time of registration.

18. Necessity of avoiding delay. – It is essential that no delay should occur in registration. In large towns the measurements under sub-sections (3) of section 7 should ordinarily be completed and the reports submitted to the Chief Inspector within ten days of the receipt of the application. In no case should the interval exceed 30 days. The Chief Inspector should issue his orders under sub-section (4) of section 7 without delay.

19. Register of registered boilers. – The Chief Inspector shall maintain a register of registered boilers in serial order in form A in two parts. In part 1 (boilers originally registered in the ¹[State]) the registered number of a boiler shall be the one immediately following the last serial number in the register. Gaps in the series due to the breaking up of boilers or to the transference of boilers to another ¹[(States)] entries shall be made as prescribed in rule 21.

20. Procedure on transfer of a boiler. – Whenever a boiler is transferred from one ¹[(State)] to another the owner shall under clause (b) of section 6 apply to the Chief Inspector of the ¹ [(State)] to which the boiler is transferred for the registration of the transfer; the boiler shall not be used until registration has been effected. The Chief Inspector shall then obtain from that ¹[(State)] the registration book and memorandum of inspection book of the boiler. No fee shall be charged for recording transfers.

21. Entries of transferred boiler in register. – On receipt of the registration book and memorandum of inspection book the Chief Inspector shall enter the boiler under its original number in part 2 of his register; the registration book and the memorandum of inspection book shall be kept in the Chief Inspector's office.

22. Note of transferred and dismantled boilers. – Whenever a boiler has been transferred or broken up the fact shall be noted in the register of the ¹[State] from which it has been transferred or in which it has been broken up. In the case of a boiler that has been permanently dismantled the registration book and the memorandum of inspection book shall be destroyed.

V – Instructions for Inspection

23. Reference to previous inspection. – Detailed instructions for the inspection of boilers are contained in part II of the Regulations. In making inspections it is important that the

¹Substituted by the A.O. 1950, for "Province".
¹Substituted , ibid, for " Province".

Inspector should pay particular attention to entries made in the Memorandum of Inspection Book at the time of the previous Inspection.

24. Procedure during Inspection. – In arranging for inspections particular attention should be paid to the provisions of clause (c) of rule 5. The notice required by sub-section (4) of section 8 shall be sent in Form B. If a hydraulic test is necessary in addition to the ordinary inspection ample notice must be given to the owner. During the inspection of one of a battery of boilers, the Inspector should take the opportunity of examining the other boilers under steam, with special reference to the water gauges, pressure gauge and safety valves.

25. Issue of certificates and Provisional Orders. – (a) When a certificate is required for a boiler application shall be made to the Chief Inspector of Boilers, by the owner or Agent one month before the date of the expiry of the last certificate. The Chief Inspector on receipt of such application together with the Treasury receipt for the prescribed fee shall arrange for the inspection to take place at an early convenient date and will arrange to send the Notice in Form B to the applicant for necessary preparation of the boiler on the date notified for the inspection.

(b) All certification must be issued from the Head Office after being countersigned by the Chief Inspector. A Provisional Order should be issued in every case of registration after hydraulic test if the Inspector is satisfied, that the conditions of section 9 of the Act are fulfilled. The steam test may be carried out at any convenient time within the period of the Provisional Order after which, if the test is satisfactory, the certificate under section 7 shall be issued.

The Inspector may where necessary authorize the working of a boiler after complete inspection for renewed certificate under section 8 on a manuscript form pending the issue of the certificate. The manuscript form pending the issue of a Provisional Order, under section 9. Where he proposes to issue a Provisional Order under section 9 the Inspector should satisfy himself that the boiler is fit to be worked at the maximum pressure and for the period entered in the provisional Order. The issue of a Provisional Order shall be reported immediately to the Chief Inspector.

The period specified on any certificate or Provisional Order shall begin on the day following that on which the completed hydraulic test or thorough inspection is made.

To group inspection work in different localities certificates valid for less than twelve months may be issued by the Chief Inspector under the provisions to section 8(5) of the Act. Where a licence is, under this section, issued for a period of less than twelve months a proportionate reduction in the license fee will be allowed.

26. Certificates and Provisional Order shall be issued in Forms V and VI respectively prescribed under the regulations but no such certificate or Provisional Order authorizing the use of a boiler shall be issued unless and until the owner of a boiler or Agent thereof engages a qualified boiler attendant and gets his number registered with the Inspector.

Duplicate copies of certificates for bona fide purpose may be issued to boiler owners during the currency of a certificate under the order of the Chief Inspector on receipt of a fee of Rs. 3 per copy.

127. (1) Fees for inspection shall be calculated on the basis of boiler rating, as prescribed in Regulation 385. The following fees are prescribed: -

For boilers rating exceeding 10 Sq. Metres.	Rs. 720/-
For boilers rating exceeding 10 Sq. Metres but not exceeding 30 sq. metres	Rs. 960/-
For boilers rating exceeding 30 but not exceeding 50 Sq. metres	Rs. 1080/-
For boilers rating exceeding 50 but not exceeding 70 sq. metres	Rs. 1320/-
For boilers rating exceeding 70 Sq. metres but not exceeding 90 sq. metres	Rs. 1560/-
For boilers rating exceeding 90 Sq. metres but not exceeding 110 sq. metres	Rs. 1800/-
For boilers rating exceeding 110 sq. metre sbut not exceeding 200 sq. metres.	Rs. 2040/-
For boilers rating exceeding 200 sq. metres but not exceeding 400 sq. metres.	Rs. 2280/-
For boilers rating exceeding 400 sq. metres but not exceeding 600 sq. metres.	Rs. 2640/-
For boilers rating exceeding 600 sq. metres but not exceeding 800 sq. metres.	Rs. 2880/-
For boilers rating exceeding 800 sq. metres but not exceeding 1000 sq. metres.	Rs. 3240/-
For boilers rating exceeding 1000 sq. metres but not exceeding 1200 sq. metres.	Rs. 3840/-
For boilers rating exceeding 1200 sq. metres but not exceeding 1400 sq.metres.	Rs.4320/-
For boilers rating exceeding 1400 sq. metres but not exceeding 1600 sq. metres.	Rs. 5040/-
For boilers rating exceeding 1600 sq. metres but not exceeding 1800 sq. metres	Rs. 5400/-
For boilers rating exceeding 1800 sq. metres but not exceeding 2000 sq. metres.	Rs. 6000/-
For boilers rating exceeding 2000 sq. metres but not exceeding 2200 sq. metres.	Rs. 6480/-
For boilers rating exceeding 2200 sq. metres but not exceeding 2400 sq. metres	Rs. 7200/-
For boilers rating exceeding 2400 sq. metres but not exceeding 2600 sq. metres.	Rs. 7560/-
For boilers rating exceeding 2600 sq. metres but not exceeding 2800 sq. metres.	Rs. 8160/-
For boilers rating exceeding 2800 sq. metres but not exceeding 3000 sq. metres.	Rs. 8640/-

Above 3000 sq. metres for every 200 sq. metres or a part thereof Rs. 240/- shall be charged.)

Provided that the Chief Inspector may direct that no fee shall be payable in respect of a fresh application made in pursuance of sub-section (2) of section 14 of the Act."/

¹Substituted by Punjab Government vide memo No. 10320-B, dated: 8-10-2007

(2)Second fee in default. – A second fee will be levied for inspection in any case where the inspection of a boiler is begun but owing to the fault or neglect of the owner or person – in – charge is not completed within a period of six months from the date of commencement of inspection.

VI – Accidents

28. Investigation of accidents. – When the Chief Inspector receives any report of accident to a boiler or steam pipe under section 18 he shall forward it at once to an Inspector, who shall with the least possible delay proceed to the place to investigate the accident.

29. Procedure during enquiry. – The Inspector at his enquiry shall make a careful examination of the damaged parts and shall take such measurements and make a careful examination of the damaged parts and shall take such measurements and make such sketches for the purpose of his report as he may deem necessary. He shall enquire into the circumstances attending the accident and note the time of its occurrence, its nature and extent, the injury caused to persons and the damage done to property.

30. Power to hold enquiry in writing. – Inspectors are authorized to take the written statements of witnesses and all persons immediately concerned with the accident. In order to comply with the provisions of sub-section (2) of section 18 the Inspector should present to the owner or person in charge of the boiler a series of written questions on all points that are material to the inquiry.

31. Use of boiler after accident. – The Inspector should decide whether the use of the boiler can be permitted at the same or at a lower pressure without repairs or pending the completion of any repairs or alterations that he may order. In no case should he issue a provisional order or renewal certificate until his orders have been carried out.

32. Procedure in case of serious accident. – The report shall be sent without delay to the Chief Inspector. If he considers that the investigation has been sufficient, he shall record the facts in his register of accidents, and enter a brief account of the accident in the registration book, a copy being made in the Memorandum of Inspection Book. If, however, the accident is occurred, the Chief Inspector should after receipt of the Inspector's report proceed to investigate the accident personally or to move the ¹[State] Government to appoint a Commission to enquire into the accident. When the ¹[State] Government has ordered an enquiry, the report thereof shall be recorded as indicated above.

¹Substituted by the A.O. 1950, for “ Provincial” which was substituted by the A.O. 1937, for “Local Government”.

33. Commissions of enquiry. – Commissions appoint under the preceding rule shall ordinarily consist of the Chief Inspector and one independent person.

34. Reference in annual report. – A brief account of all accidents and their causes should be included in the Chief Inspector's Annual Report.

35. If in the course of inspection, or any other time, the Inspector discovers damage which comes within the definition of an accident, but which has not been reported he shall report the facts at once to the Chief Inspector for action under clause (d) of section 24.

VII – Appeals

36. Filing of appeal. – Every petition of appeal shall be made in writing either in English or in the vernacular, and should, under Article 11 of Schedule II of the Court Fee Act, 1870, as amended by the Court Fees (Punjab) Amendment Act, 1922, bear a Re. 1 stamp.

37. Presentation of appeal. – An appeal may be presented either personally or by registered post to the Chief Inspector.

38. Form of appeal. – The petition of a appeal shall be accompanied by the original order, notice or report appealed against, or by a certified copy thereof, or, where no such order, notice or report has been made in writing, by a clear statement of facts appealed against, the grounds of appeal and the relevant section of the Act.

39. Fixing date for hearing. – On receipt of an appeal the Chief Inspector shall, if the appeal is to be heard by himself, at once fix a date for hearing the appeal; and, if it is to be heard by the appellate authority, obtain a date for the hearing of the appeal from the President of the Court. It is important that there should be no delay in the decisions of appeals, as the stoppage of a boiler is likely to put the owner thereof to great inconvenience. The decision should ordinarily be given within 10 days from the receipt of the petition of appeal.

40. Presence of Inspector. – When the date of hearing has been fixed, the Chief Inspector shall at once issue a notice to the appellant stating the date of hearing and informing him that if he wishes to be heard in support of the appeal or to produce evidence, he must be present either in person or by authorized agent with his evidence on the date fixed. The notice shall be sent to such address as shall be entered in the petition of appeal.

41. Presence of Inspector. – In all appeals the Chief Inspector shall decide whether the presence of Inspector is necessary and shall issue orders accordingly.

42. Attendance of witnesses.—The appellate authority shall have power to secure the attendance of witnesses and to make local inquiries under the provisions of the Code of Civil Procedure.

43. Ex-parte decisions.—If the appellant is not present on the date fixed the appeal may be decided in his absence.

44. President of Appellate Court.—The (State) Government shall appoint an officer to be President of the Appellate court for such period as it thinks fit. The president shall be as officer with judicial or magisterial experience.

45. Panel of assessors.— The ¹(State) Government shall constitute a panel of assessors for the purpose of assisting in the hearing of appeals. Assessors must be fully qualified mechanical engineers.

46. Constitution of Appellate Court.— Whenever the date for an appeal before the appellate Court has been fixed, the Chief Inspector shall, under the orders of the president of the Court, arrange for the attendance of three members of the panel constituted under the preceding rule to act as assessors.

47. Costs in appeals.— In appeals before the appellate authority the President is authorised to fix the costs and recover them from the appellant in any case in which the appeal is dismissed; in all cases of appeal in which a local inspection is required by the appellant he shall deposit in advance the full cost of such inspection.

48. Fees required for certificate granted on appeal. — Any order of appeal authorizing the registering of a boiler or the grant or renewal of a certificate shall be deemed to be subject to the payment of such fees as are prescribed by rules or regulations framed under the Act.

49. } Repealed by Punjab Government notification No. 2936.

50. } VII-DS Lab-61/22 929, dated: the 18th August, 1961.

51. *Penalty.* — Any person who-----

- (a) Willfully obstructs an Inspector in the exercise of any power conferred by any rules made under the Act,
- (b) Does or omits to do any act prohibited or prescribed by regulations or by these rules, shall be punishable with fine which may extend to one hundred rupees.

FORM A

BOILER INSPECTION DEPARTMENT.

Register of Boilers

1	2	3	4	5	6	7	8	9
Registry number	Type of boiler	Boiler rating	Name of manufacturer	Year and place of construction	Date of Registration	Name of owner	Place where in use	Remarks transfers etc.

In part II of the Register, column I should contain the Registry Number and letters.

FORM B

INDIAN BOILERS ACT, 1923 Act V of 1923

Notice for examination of Boiler under section 8.

No. _____ of 19____,

BOILER INSPECTION OFFICE

To

In reply to your application, dated _____ you are hereby informed that Boiler Registry No. _____ at the above named premises thoroughly examined. Will be thoroughly examined /Hydraulically tested by the Government Inspector on the _____. To enable the examination to be made you are required to _____.

- a) Afford to the Inspector all reasonable facilities for such examination and all such information as may reasonably be required by him.
 - b) Arrange that the boiler is properly prepared for examination in the prescribed manner;
 - c) Provide in the case of a boiler about to be registered such drawing specification and certificates as may be prescribed
- Bank

Voucher No. _____ acknowledgment of _____
 Receipt No. _____ for Rs. _____

Treasury accompany

Inspector of Boilers
 (See below for preparation required.)

PREPARATION FOR EXAMINATION

See part II. Chapter 1. Of the regulations and regulation 31.

(a) Preparation for inspection.

At every inspection of a boiler for the grant or renewal of a certificate the boiler shall be empty and thoroughly clean in all its parts; all doors of manholes, hand hole and sight holes, and cleaning plugs and all caps in the header and mud drums of water tube boilers, all fire bars, bearers, front plates, bridges plates, fire bridges, brick arches, oil fuel burners and mechanical stoker fittings shall be removed. All valves and cocks comprising the boiler mountings shall be opened up and taken apart and the valves or cocks ground, where necessary before the Inspector's visit.

Provision shall be made for the removal of lagging or brickwork or other concealing part and for the drilling of plates, if required by the Inspector and for verifying the pressure gauge and safety valves dimension and weights. All smoke tubes, smoke boxes, and external flues shall be swept clean.

Provision shall be made for the effective disconnection of all steam and hot water communication with any other boiler under steam as described in part III of the regulations. this shall be effected either by the removal of the length of pipe from the steam and feed piping or by the insertion of substantial blank hangs . Where blank hangs are employed, they must be inserted between the hangs of the chest and the pipe attached to it. No blank hangs shall be inserted between a safety valve chest and the boiler.

NOTE: - These provisions as to effective disconnection shall extend to every case wherein a person is sent, or with the assent of the owner or person in charge goes into a boiler for any purpose.

(b) Preparation for hydraulic test.

The chests of all mountings subject to steam pressure shall be in place and shut tight or blank flanged. The safety valves should either be jammed down or removed, and the chest opening blank flanged. The attachment for the Inspector's pressure gauges and the nipple for connecting the inspector test pump hose should be in order. The receiving socket shall be fitted with an easily removable cap. In the case of small boilers which cannot be entered by an Inspector and which are hydraulically tested as each inspection a plug hole tapped 7/8" British Standard Whitworth thread shall be provided in a handy position for the attachment of the Inspector's test pump hose nipple. All doors shall be properly jointed and tightened up. The boiler shall be completely filled with water, care being taken to allow all air to escape and, if possible, a preliminary test not exceeding the working pressure of the boiler should be taken before the Inspector's visit to test the tightness of the joints. When a boiler is hydraulically tested for the first time it shall be entirely cleared of lagging and brickwork; at subsequent tests the lagging or brickwork or portions thereof shall be removed if required by the Inspector.

Preparation now required A.B.

Note:- The last certificate of the border along with the attendants certificate of competency should be shown to the Inspector.

APPENDIX A**GENERAL WORKING OF BOILERS****Instructions to Boiler Attendants**

(Taken from page 157 of the Boiler Laws Commutee's , report.)—These instrucion should be frequently and carefully studied. with a view to keeping in mind the precautions to be observed, and the ordinary procedure to be followed in the safe working of boilers.

Precautions before starting the fires.

Before starting fires in the boiler the attendant should-

- 1) See that there is sufficient water in the boiler and that the gauge cocks are working freely;
- 2) Ease safety valves or open cock on top of boiler to allow air to escape;
- 3) See that the blow off cock is fully closed and tight;
- 4) see that the safety valves and feed check valve are free and workable;
- 5) see that the water is not leaking from any part of the boiler;
- 6) note if the pressure gauge pointer is at zero;
- 7) see that the feed pump is in working order;

He must not rely on the supposition that the water, he has previously put in is still in the boiler, as it may have now run out without his knowledge through a leak or open cock. nor can he be sure, that the gauge glass shows the true water level until he has tested it. This is done in the following manner: ' Shut off the lower gauge cock, and empty the drain cock; then shut the drain cock and open the gauge cock; if everything is in order, the water will then rise in the glass to the same height as before.

Raising Steam.

In getting up steam in all types of boilers, the operation should be as gradual as circumstances will allow. Nothing turns a new boiler into an old one sooner than getting up steam too quickly. Forcing the fires when starting work is liable to cause straining of the steams and tubes of the boiler. In the case of large boilers, generally, steam should not be got up in less than six hours, before getting up the steam the water level should be observed, to ensure that water is at the proper height in the glass, the pressure gauge noted, and the safety valves tried to see they are free. The blow-off cock should be examined to see that it is completely shut and tight.

Pressure Gauge.—The pressure or steam gauge should be kept in order, and be in such a position as to be easily seen by

the boiler attendant. There should be a plain mark on it showing the highest pressure allowed for the boiler and the dial should be kept clean so that figures may easily be read .

Steam Pressure – Ordinarily the safety valve will prevent the steam from rising much above pressure, but if the steam gauge shows so rapid an increase of pressure as to indicate danger of exceeding the highest limit, water should be immediately fed into the boiler and the dampers partially closed in order to diminish the effect of the fire.

If, however, the water has fallen so low that there is danger of an accident from this cause, the fires should be withdrawn before feeding in water, the safety valves eased and if the engine is at rest, it should be started so as to reduce the pressure.

The safety valves are provided to guard against over pressure. They should be moved by hand every day so as to prevent them from sticking. If moved only occasionally these are liable to leak.

The valve can be tested by slowly raising it a little, and when let down it should close perfectly tight. It should never be opened by a sudden knock or pull. If it does not close tight, turn it on its seat until it fits, or when its construction does not permit this, raise it slowly a few times and let it down again, but on no account must valve be screwed down further or loaded more than what has been allowed by the Inspector.

Safety valves must never be overloaded, and spring valves should have ferrules or other provisions against their being screwed down too far. In case of an accident resulting from willful overloading the culprit might be held criminally responsible at the official enquiry or inquest.

Low Water Safety Valves – If there is a low water safety valve, test it occasionally by lowering the water level to see that the valve begins to blow at the right point. It should give warning “before” the water-level has sunk too low, and before damage can be done. When the boiler is opened, examine the floats and lever and see that they are free, and that they give the valve the full rise. With the ordinary type of high steam and low water safety valve, the float should be down at its lowest position and the valve full open when the boiler is empty.

The Water Gauges.—These will be kept best in order by frequently blowing through. The cocks are thus kept in good working condition without leaking. Blow through the drain cock at the bottom of the gauge, and shut and open the steam and water-cocks every few hours. These cocks should be blown through more frequently when the water is dirty. Should either of the passages become choked. or whenever the water in

the gauge glass moves sluggishly the passage must be cleaned. This is best done with a wire. The gauge glass is so arranged that its top cock connects with the steam space and its bottom cock is below the water line. The water line will ordinarily be near the centre of the glass tube. Always test the glass water gauges thoroughly the first thing in the morning and at the commencement of every shift. This is done by first opening the drain cock, then shutting the upper cock which should give water; the upper cock should then be opened and the bottom cock-closed- which should give steam; during this test the drain cock should be kept open.

If water and steam do not appear in proper order, the cocks are choked and the passages should be cleaned. To lessen the risk of breaking the gauge glass the water cock should always be re-opened after the steam cock.

Gauge glasses with a narrow white stripe running the whole length of the glass on the side next the boiler are recommended as they show the water line more clearly, especially when the water is dirty.

The Government boiler regulations require every water gauge glass to be fitted with a guard to prevent injury to the attendants. See that it is always in place, and clean when there is steam in the boiler.

Special Note.—It does follow that there is plenty of water in the boiler because there is plenty of water in the gauge glass. The passages may be choked and empty gauge glasses are sometimes mistaken for full ones, and explosions have resulted therefrom. Hence the importance of keeping the gauge cocks perfectly tight and clean and of blowing through that cocks frequently.

A large number of accidents have been due to inoperative water gauges and to negligence of the attendant in not carefully reading the water-level.

The blow-off cock.—The blow-off should be used daily if the water is at all dirty or sedimentary, especially with locomotive type and vertical boilers, as their narrow water spaces are liable to get choked with mud, which soon hardens into a solid mass. The amount of water to be blown out depends on the size of the boiler and can be determined only from experience. When blowing out the best result is obtained, if the water has been at rest for some time (say, before the engine is started) thus giving the sediment time to settle; if the feed water is clean, merely turn the cock round.

The scum cock.—When scum cocks are fitted, if the feed water is dirty a little should be blown off daily, if the water is clean, merely turn the cock round. Before opening the scum

cock see that the water is at the height indicated by the water level pointer, otherwise the scumming will be ineffective. Water should be blown from the surface through the scum cock when steam is being drawn off, i.e., when the engine or other machinery is working.

Manhole and other door joints.—When making such joints, the jointing material should never be of round sectioned packing. Care must be taken that the spigot of the door is centrally placed in the hole, as many accidents have resulted from packing being blown out between the spigot and side of hole, even when the clearance was only 1/8 inch. The nuts must be carefully and evenly tightened.

Steam Pipes.— When properly arranged, should give no trouble. Frequently, however, they are so designed as to contain pockets, in which, while out of use, condensed steam accumulates. Such water is exceedingly dangerous and great care should be taken to see that the pipes are properly drained before the stop valve is opened, otherwise “water hammer” will take place even with the best designed steam pipes, and disastrous explosions, causing loss of life and property, may occur.

Scale and grease.—Roughly speaking, scale offers a hundred times as much resistance to the passage of heat as does a similar thickness of steel or iron. A half-inch furnace plate covered with 1/10th inch scale is as efficient heat retarder as a steel furnace 10 inches thick. Grease is about ten times worse than scale. In a boiler at work the temperature of a clean furnace plate is only slightly in excess of that of the water in the boiler; but if scale or grease is interposed between the water and the plate, the latter acquires a temperature more nearly approximating that of the flame with which it is in contact. If the fire is fierce (artificial draught) the furnace tube may grow so hot that it elongates considerably. If, in addition, cold air is admitted, during each firing, a concertina action of the furnace takes place, which is one of the worst causes of boiler wear and tear. Wear and tear can be reduced and the life of a boiler prolonged if scale and grease are prevented from accumulating in a boiler. The combined effect of effect of scale or grease and artificial draught are disastrous. Scale or grease also causes waste of fuel.

Grease.—A mixture of sedimentary water, soda and grease produces an adhesive scum. Where this is suspected, the water level should never be lowered below the furnace top, unless the boiler is afterwards entered and this scum cleaned off the furnace plate before firing again.

Scale Removal.—The customary method is not a satisfactory one. The boiler is emptied and then cooled down by opening all the manholes, and the result is that the scale, which would otherwise be soft, hardens through contact with the air, and requires laborious chipping off.

A very effective, but slower method, is to retain the water in the boiler until cool, and not to run it out until the men are ready to enter the boiler with water hose, brushes and scrapers. The scale will then be soft and easily removable. If time is a consideration, the cooling can be accelerated by adding cold feed to the hot water in the boiler and slowly running off the cooled water. Another method is to blow off the boiler with the lowest possible pressure (not more than 20 lb.) and to keep it closed until cold. The scale will then be easily removed.

Treatment of feed water.—Many feed waters require soda or other chemical to arrest corrosion or to change the nature scale. There is no harmless chemical which will remove scale of sediment when it has once got into the boiler, and the only effective process is to purify the feed water before it enters the boiler. By this means the sediment, and generally, too, the added chemical, can be deposited in tanks or in filters, and therefore never goes into the boiler. Excepting when the water obtainable is very good water, purifying apparatus ought to pay any boiler owner, particularly at those works where three or more boilers are in constant work. Boiler owners wishing to have definite advice as to the best treatment of their feed water should have it analysed at some chemical laboratory and ascertain the best treatment in the particular circumstances.

Special attention is drawn to the not infrequent but very bad practice of allowing the waste steam from the engine cylinders or pumps to be drained into the boiler feed water tanks. The waste from cylinders is always mixed with a certain amount of oily matter, which will be deposited in the feed water tanks and ultimately be pumped into the boiler, with possibly disastrous results, as it will be obvious to every careful boiler attendant that should the oil be deposited on the furnace crowns, they may become ever heated and collapse.

It should be the first care of the boiler owner and the boiler attendant to see that the feed water is kept as pure as possible. Impure feed water means additional expense on the upkeep of the boiler.

Preservation of boilers when not in use- Steam boilers when not in use are liable to deterioration from corrosion and unless well cared for and made rust-proof, they may depreciate more rapidly than when in use. They should be thoroughly drained and thoroughly dried and all valves, cocks and openings closed so as to exclude moisture. Another plan is to fill the boiler with water to which about 1/100 per cent caustic soda has been added.

Special Instruction for Boiler No. _____

This boiler should be opened up and thoroughly cleaned after a period of work which should not exceed _____. A record of such cleanings should be maintained and produced when required by the Inspector.

Dated _____

Inspector of Boilers