Public Works (1897) Department.

Very Emergent.

G.O., No. 215 W

DATED 23. January

[Despatch Abstract.]

Madras Steam Boilers and Prime Movers Act III of 1893: Ordered that certain notifications under the — ~~Act~~ declaring that the Act shall come into force on the 1st February 1897 and making certain rules under the Act, be published in the Fort St. George Gazette

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T.C. 23/1

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GENERAL.
ESTABLISHMENT.

Government {1897} of Madras.

PUBLIC WORKS.

Recd. } 1897. *Enclosures*

Regd. } *Spare copies*

G.O., No. 215 W., 23rd January 1897.

JANUARY.

Madras Steam-boilers and Prime-movers Act III of 1893

Ordered that certain notifications under the — declaring that the Act shall come into force on the 1st February 1897 and making certain rules under the Act, be published in the *Fort St. George Gazette*.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Establishment.

READ—the following papers :—

From the Sanitary Engineer to Government and Inspector of Boilers (Ex-officio), dated 17th December 1896, No. 3491.

From do. do. do. dated 18th December 1896, No. 3495

ORDER—No. 215 W., dated 23rd January 1897.

Ordered that the following notifications be published in the *Fort St. George Gazette* :—

NOTIFICATION A.

Whereas by notification published in the *Fort St. George Gazette* of the 4th August 1896, Part I, page 949, it was declared that the introduction of the Madras Steam-boilers and Prime-movers Act III of 1893 shall be postponed until further orders, it is now declared, under sub-section (2) of section 1, that the said Act shall come into force upon the **1st February 1897.**

NOTIFICATION B.

His Excellency the Governor in Council is pleased, in accordance with section 23 of the Madras Steam-boilers and Prime-movers Act III of 1893, to make the following rules under the said Act, and to declare that they shall come into force with effect from the **1st February 1897** :—

A.—Preliminary.

1. These rules may be called the Boiler Examination Rules.

2. In these Rules—

(*a*) "The Act" means the Madras Steam-boilers and Prime-movers Act, 1893 ;
(*b*) "Section" means a section of the said Act ;
(*c*) "Examination" means the examination of boilers under the Act, and "examination fees" means fees leviable on account of the examination of boilers.

B.—The Inspector.

3. The Inspector shall not undertake any professional work unconnected with his business under the Act except with the approval, or under the orders, of Government.

4. The Inspector shall receive such salary as Government may determine, all examination fees being credited to Government.

5. The Inspector shall have an office in which all records connected with the working of the Act shall be kept.

6. The Inspector shall keep the following records :—

(*a*) a register of examination fee receipts ;
(*b*) a book containing counterfoils of licenses ;
(*c*) a register of boilers in the following form which has been prescribed under section 9 :—

Name of owner.	Place where boiler is situated.	Registry number and description of boiler and age.	Nominal horse power.	When, where and by whom made.	When and where last repaired.	Date of grant of license.	Maximum pressure at which boiler may be worked.	Time for which this license is to be in force.	Remarks.

(*d*) a book containing a detailed account of every examination made by him ;
(*e*) a diary of the work done by him from day to day ;
(*f*) a register of licenses suspended or revoked under section 11 (this register to be prepared upon information furnished to the Inspector by the suspending or revoking authority, *i.e.*, the Sanitary Engineer) ;
(*g*) a register showing the result of appeals presented under section 12 (this register to be prepared upon information furnished to the Inspector by the Chief Presidency Magistrate).

7. The Inspector shall furnish to the Sanitary Engineer, on the third working day of every month, a copy of his diary for the preceding month.

8. All examination fees shall be paid into the Madras Bank by the owners of boilers and no boiler shall be examined under section 5 unless the notice sent to the Inspector under that section is accompanied by a Bank receipt for the fee ; and the Inspector, if he finds that the right fee has not been paid, may decline to examine the boiler until it has been paid.

9. An extract from the register of examination fee receipts which is compiled by the Inspector from the Bank receipts referred to in Rule 8 shall be forwarded by him, monthly, to the Accountant-General who shall verify it by reference to the amount actually received on account of examination fees during the month to which the extract relates and forward it to the Sanitary Engineer for record.

10. The Inspector shall be subordinate to the Sanitary Engineer and shall obey all lawful orders issued to him by that officer.

C.—Examinations.

11. Examination fees shall be paid in accordance with the following scale :—

								RS.
(i)	For the examination of each boiler not exceeding				10	N.H.P.	...	12
(ii)	,,	,,	,,	,,	20	,,	...	16
(iii)	,,	,,	,,	,,	30	,,	...	24
(iv)	,,	,,	,,	,,	50	,,	...	32
(v)	,,	,,	,,	boiler exceeding	50	,,	...	40

12. Examinations will not be made on Sundays except in cases of absolute necessity ; in such cases the fees may be increased 25 per cent., the Inspector and his staff being allowed to divide the additional fee amongst them in proportion to their pay.

Iron Boilers.

13. The Inspector is required by the Act to fix the pressure to be allowed on boilers. In performing this very responsible and onerous duty he must be very careful, as in the event of accident it will be necessary for him to prove clearly that he used due caution. On the one hand he must be careful as regards safety, and on the other hand he must not unduly reduce the pressure on a boiler.

14. The Inspector should fix the working pressure for boilers by a series of calculations of the strength of the various parts, and according to the workmanship and material.

In the case of boilers made in India, the Inspector may receive and examine plans and particulars of boilers before the commencement of manufacture with the object of preventing questions arising after the boilers are finished.

When the Inspector has received plans and tracings of new boilers, or of alterations of boilers, and has approved of them, he will of course be careful in making his examination, when the boiler is ready for work, to see that they have been followed out. When he has not had the plans submitted, but is called in to inspect a boiler, he will of course measure the parts, note the details of construction, and, if necessary, bore the plates to ascertain their thickness, &c., before he gives his certificate.

The Inspector shall not declare a boiler to be safe unless (*a*) he is fully informed as to its construction, material and workmanship, or unless (*b*) he is furnished with a certificate from a Chief Engineer of a recognised boiler insurance company. He should therefore be very careful how he ventures to give a certificate.

15. In the case of new boilers the Inspector may allow a stress not exceeding 7,000 lb. per square inch of net section on solid iron screwed stays supporting flat surfaces, but the stress should not exceed 5,000 lb. when the stays have been welded or worked in the fire.

The areas of diagonal stays are found in the follcwing way: Find the area of a direct stay needed to support the surface, multiply this area by the length of the diagonal stay, and divide the product by the length of a line drawn at right angles to the surface supported to the end of the diagonal stay; the quotient will be the area of the diagonal stay required.

When gusset stays are used, their area should be in excess of that found in the above way.

16. When the tops of combustion boxes or other parts of a boiler are supported by solid rectangular girders, the following formula should be used for finding the working pressure to be allowed on the girders, assuming that they are not subjected to a greater temperature than the ordinary heat of steam, and in the case of combustion chambers that the ends are fitted to the edges of the tube plate and the back plate of the combustion box.

$$\frac{C \times d^2 \times T}{(W-P)\, D \times L} = \text{Working Pressure.}$$

W = Width of combustion box in inches.
P = Pitch of supporting bolts in inches.
D = Distance between the girders from centre to centre in inches.
L = Length of girder in feet.
D = Depth of girder in inches.
T = Thickness of girder in inches.
C = 500 when the girder is fitted with one supporting bolt.
C = 750 when the girder is fitted with two or three supporting bolts.
C = 850 when the girder is fitted with four supporting bolts.

The working pressure for the supporting bolts and for the plate between them should be determined by the rule for ordinary stays.

17. The pressure on plates forming flat surfaces is found by the following formula:—

$$\frac{C \times (T+1)^2}{S-6} = \text{Working Pressure.}$$

T = Thickness of the plate in sixteenths of an inch.
S = Surface supported in square inches.
C = Constant according to the following circumstances.
C = 100 when the plates are not exposed to the impact of heat or flame, and the stays are fitted with nuts and washers, the latter being at least three times the diameter of the stay and two-thirds the thickness of the plates they cover.*
C = 90 when the plates are not exposed to the impact of heat or flame, and the stays are fitted with nuts only.
C = 60 when the plates are exposed to the impact of heat or flame, and steam in contact with the plates, and the stays fitted with nuts and washers, the latter being at least three times the diameter of the stay and two-thirds the thickness of the plates they cover.
C = 54 when the plates are exposed to the impact of heat or flame, and steam in contact with the plates, and the stays fitted with nuts only.
C = 80 when the plates are exposed to the impact of heat or flame with water in contact with the plates, and the stays screwed into the plates and fitted with nuts.
C = 60 when the plates are exposed to the impact of heat or flame, with water in contact with the plates, and the stays screwed into the plates, having the ends riveted over to form substantial heads.
C = 36 when the plates are exposed to the impact of heat or flame, and steam in contact with the plates, with the stays screwed into the plates, and having the ends riveted over to form substantial heads.

* If the diameter of riveted washers be at least two-thirds the pitch of the stays, and the thickness not less than the plates they cover, the constant may be increased to 150.
When doubling plates are fitted of the same thickness as the plates they cover and not less in width than two-thirds the pitch of the stays, the constant may be increased to 160.

In cases where plates are stiffened by T or L irons, and a greater pressure is required for the plates than is allowed by the use of the above constants, the case should be submitted for the consideration of the Sanitary Engineer.

When the riveted ends of screwed stays are much worn or when the nuts are burned, the constants should be reduced, but the Inspector must act according to the circumstances that present themselves at the time of inspection, and it is expected that in cases where the riveted ends of screwed stays in the cumbustion boxes and furnaces are found in this state, it will be often necessary to reduce the constant 60 to about 36.

The Inspector should not in any case allow a greater compressive stress on the edge of the tube plates than 7,500 lb. per square inch, which is that used in the following formula:—

$$\frac{(D-d)\, T \times 15{,}000}{W \times D} = \text{Working Pressure.}$$

D = least horizontal distance between centres of tubes in inches.
d = inside diameter of ordinary tubes in inches.
T = thickness of tube plate in inches.
W = extreme width of combustion box in inches from front of tube plate to back of fire-box, or distance between combustion box tube plates when boiler is double ended and the box common to the furnaces at both ends.

18. The Inspector should take care that boilers, the outside of which cannot be seen, are cleared of all covering and fittings for inspection whenever the Inspector considers it necessary. It will often be found necessary to reduce the pressure, unless the boilers are partially cleared from their seats to enable the Inspector to judge of their condition. If the owners in any special case have any good reasons for not wishing to clear them when the Inspector requires it, the Inspector should submit the whole case in detail to the Sanitary Engineer for his consideration. The Inspector must recollect that he is not to certify as sufficient any boiler respecting which he cannot thoroughly satisfy himself.

The Inspector should record in his inspection book the dates on which boilers are inspected, when and to what extent cleared from brick work, and whether the boilers were set or not when examined, and if not set, where they were examined. Boilers which have been cleared should in all cases be subjected to the hydraulic test before the brick work is rebuilt.

19. Boilers well constructed, well designed, and made of good material should have an advantage in the matter of working pressure over boilers inferior in any of the above respects, as unless this is done the superior boiler is placed at a disadvantage, and good workmanship and material will be discouraged. The following rules are therefore prescribed.

When cylindrical boilers are made of the best material with all the rivet holes drilled in place and all the seams fitted with double butt straps each of at least five-eights the thickness of the plates they cover, and all the seams at least double riveted with rivets having an allowance of not more than 75 per cent. over the single shear and provided that the boilers have been open to inspection during the whole period of construction, then 5 may be used as the factor of safety. The tensile strength of the iron is to be taken as equal to 47,000 lb. per square inch with the grain, and 40,000 lb. across the grain. But when the above conditions are not complied with, the additions in the following scale must be added to the factor 5, according to the circumstances of each case:—

A †	·15	To be added when all the holes are fair and good in the longitudinal seams, but drilled out of place after bending.
B †	·3	To be added when all the holes are fair and good in the longitudinal seams, but drilled out of place before bending.
C	·3	To be added when all the holes are fair and good in the longitudinal seams, but punched after bending instead of drilled.
D	·5	To be added when all the holes are fair and good in the longitudinal seams, but punched before bending.
E *	·75	To be added when all the holes are not fair and good in the longitudinal seams.
F	·1	To be added if the holes are all fair and good in the circumferential seams, but drilled out of place after bending.
G †	·15	To be added if the holes are fair and good in the circumferential seams, but drilled before bending.
H	·15	To be added if the holes are fair and good in the circumferential seams, but punched after bending.
I †	·2	To be added if the holes are fair and good in the circumferential seams, but punched before bending.
J *	·2	To be added if the holes are not fair and good in the circumferential seams.
K	·2	To be added if double butt straps are not fitted to the longitudinal seams, and the said seams are lap and double riveted.
L	·1	To be added if double butt straps are not fitted to the longitudinal seams, and the said seams are lap and treble riveted.

M	·3	To be added if only single butt straps are fitted to the longitudinal seams and the said seams are double riveted.
N	·15	To be added if only single butt straps are fitted to the longitudinal seams and the said seams are treble riveted.
O	·1	To be added when any description of joint in the longitudinal seams is single riveted.
P	·1	To be added if the circumferential seams are fitted with single butt straps and are double riveted.
Q	·2	To be added if the circumferential seams are fitted with single butt straps and are single riveted.
R	·1	To be added if the circumferential seams are fitted with double butt straps and are single riveted.
S	·1	To be added if the circumferential seams are lap joints and are double riveted.
T	·2	To be added if the circumferential seams are lap joints and are single riveted.
U	·25	To be added when the circumferential seams are lap, and the stakes of plates are not entirely under or over.
V‡	·3	To be added when the boiler is of such a length as to fire from both ends, or is of unusual length, as in the case of flue boilers; and the circumferential seams fitted as described opposite P, R, and S, but of course when the circumferential seams are as described opposite Q and T, V ·3 will become V ·4.
W*	·4	To be added if the seams are not properly crossed.
X*	·4	To be added when the iron is in any way doubtful, and the Inspector is not satisfied that it is of the best quality.
Y	1·65	To be added if no certificate is produced from a Chief Engineer of a recognised Boiler Insurance Company or if the boiler was not open to inspection during the whole period of its construction by the Inspectors of any recognized Boiler Insurance Company.

Where marked * the factor of safety should be increased still further if the workmanship or material is very doubtful or is very unsatisfactory.

† When the holes are to be rimered, or bored out in place, the case should be submitted to the Sanitary Engineer as to the reduction or omission of A, B, G, and I as heretofore.

‡ When boilers are comparatively short, the cases should be submitted to the Sanitary Engineer for consideration as to the omission of V as heretofore.

When the circumferential seams are double strapped and double riveted or lapped and treble riveted, and the calculated strength not less than 65 per cent. of the solid plate V, ·3 may be omitted as heretofore.

The strength of ordinary joints is found by the following method :—

$$\frac{(\text{Pitch} - \text{Diameter of rivet}) \times 100}{\text{Pitch}} = \left.\right\} \text{Percentage of strength of plate at joint as compared with the solid plate.}$$

$$\frac{(\text{Area of rivet} \times \text{No. of rows of rivets}) \times 100}{\text{Pitch} \times \text{thickness of plate}} = \left.\right\} \text{Percentage of strength of rivets as compared with the solid plate.*}$$

Then take iron as equal to 47,000 lb. per square inch and use the smaller of the two percentages as the strength of the joint, and adopt the factor of safety as found from the preceding scale.

$$\frac{(47{,}000 \times \text{percentage of strength of joint}) \times \text{twice the thickness of the plate in inches.}}{\text{Inside diameter of the boiler in inches} \times \text{factor of safety}} = \text{Pressure to be allowed per square inch on the safety-valves.}$$

In the case of ordinary zigzag riveting the strength through the plate diagonally between the rivets, when diagonal pitch $= \frac{6}{10}$ horizontal pitch $+ \frac{4}{10}$ diameter of rivet.

Plates that are drilled in place must have been taken apart and the burr taken off and the holes slightly countersunk from the outsides.

Butt straps must have been cut from plates and not from bars, and must be of as good a quality as the shell plates, and for the longitudinal seams must be cut across the fibre. The rivet holes may have been punched or drilled when the plates are punched or drilled out of place, but when drilled in place must have been taken apart and the burr taken off and slightly countersunk from the outside.

When single butt straps are used and the rivet holes in them punched, they must be one-eighth thicker than the plates they cover.

The diameter of the rivets must not be less than the thickness of the plates of which the shell is made, but it will be found when the plates are thin, or when lap joints or single butt straps are adopted, that the diameter of the rivets should be in excess of the thickness of the plates.

Dished ends must be stayed as flat surfaces; but when they are theoretically equal to the pressure needed, when considered as portions of spheres, the stays when solid may have a stress of 14,000 lb per square inch of net section, but the stress should not exceed 10,000 lb. when the stays have been welded or worked in the fire.

* If the rivets are exposed to double shear, multiply the percentage as found by 1·75.

Truly hemispherical ends subjected to internal pressure may be allowed double the pressure that is suitable for a cylinder of the same diameter and thickness.

All man-holes and openings must be stiffened with compensating rings of at least the same effective sectional area as the plates cut out, and in no case should the plate rings be less in thickness than the plates to which they are attached. The openings in the shells of cylindrical boilers should have their shorter axes placed longitudinally. It is very desirable that the compensating rings round openings in flat surfaces be made of L or T iron. Cast-iron doors are not to be passed.

The neutral part of boiler shells under steam domes must be efficiently stiffened and stayed, as serious accidents have arisen from the want of such precautions.

20. New boilers are to be tested by hydraulic pressure according to the following scale :—

Boilers intended to work up to 100 lb. pressure per square inch or any pressure below that are to be tested to double the working pressure.

Above	lb. 100	up to	lb. 125	to be tested to	lb. 200.
„	125	„	150	„	230.
„	150	„	175	„	250.
„	175	„	200	„	270.
„	200	„	225	„	290.
„	225	„	250	„	310.
„	250	„	275	„	330.
„	275	„	300	„	350.

Any boilers intended for working pressure above these to be tested to not less than 50 lb. above such working pressure.

In the case of old boilers the Inspector must use his own judgment as to the necessary pressure to be applied.

21. Circular furnaces with the longitudinal joints welded or made with a butt strap.

$$\frac{90{,}000 \times \text{the square of the thickness of the plate in inches}}{(\text{Length in feet} + 1) \times \text{diameter in inches}}$$

= working pressure per square inch, provided it does not exceed that found by the following formula :—

$$\frac{8{,}000 \times \text{thickness in inches}}{\text{diameter in inches.}} = \left.\right\} \text{Working pressure per square inch.}$$

The second formula limits the crushing stress on the material to 4,000 lb. per square inch.

The length is to be measured between the rings if the furnace is made with rings.

If the longitudinal joints instead of being butted are lap-jointed in the ordinary way, then 75,000 is to be used instead of 90,000, excepting only where the lap is bevelled and so made as to give the flues the form of a *true* circle, when 80,000 may be used.

When the material or the workmanship is not of the best quality, the constants given above must be reduced, that is to say, the 90,000 will become 80,000, the 80,000 will become 70,000, the 70,000 will become 60,000; when neither the material nor the workmanship is of the best quality, such constants will require to be further reduced, according to circumstances and the judgment of the Inspector, as in the case of old boilers. One of the conditions of best workmanship is that the joints are double riveted with double butt straps, or single riveted with double butt straps, and the holes drilled after the bending is done and when in place and the plates afterwards taken apart, the burr on the holes taken off and the holes slightly countersunk from the outside.*

* The following examples will serve to show the application of the constants for the different cases that may arise :—

Furnaces with butt joints and drilled rivet holes—
- 90,000 where the longitudinal seams are welded.
- 90,000 „ „ „ double riveted and fitted with single butt straps.
- 80,000 „ „ „ single „ „ single „
- 90,000 „ „ „ „ „ double „

Furnaces with butt joints and punched rivet holes—
- 85,000 where the longitudinal seams are double riveted and fitted with single butt straps.
- 75,000 „ „ „ single „ single „
- 85,000 „ „ „ „ „ double „

Furnaces with lapped joints and drilled rivet holes—
- 80,000 where the longitudinal seams are double riveted and bevelled.
- 70,000 „ „ „ „ and not bevelled.
- 70,000 „ „ „ single „ and bevelled.
- 65,000 „ „ „ „ and not bevelled.

Furnaces with lapped joints and punched rivet holes—
- 75,000 where the longitudinal seams are double riveted and bevelled.
- 70,000 „ „ „ „ and not bevelled.
- 65,000 „ „ „ single „ and bevelled.
- 60,000 „ „ „ „ and not bevelled.

In the case of upright fireboxes of donkey or similar boilers, 10 per cent. should be deducted from the constants given above, applicable to the respective classes of work.

The working pressure for corrugated furnaces, practically circular and machine made, provided the plane parts at the ends do not exceed 6 inches in length, and the plates are not less than $\frac{5}{8}$ inch thick, should not be greater than found by the following formula:—

$$\left.\frac{9{,}000 \times \text{thickness in inches}}{\text{Mean diameter in inches}} = \right\} \text{Working pressure per square inch.}$$

Steel Boilers.

22. For steel boilers the rules for iron boilers may be increased as follows:—

The constants for flat surfaces when they are supported by stays screwed into the plate and riveted, 10 per cent. The constants for flat surfaces when they are supported by stays screwed into the plate and nutted, or when the stays are nutted in the steam space, 25 per cent. This is also applicable to the constants for flat surfaces stiffened by riveted washers or doubling strips, and supported by nutted stays.

The constants for cumbustion box girders, 10 per cent.

Boilers—General.

23. Small boilers must be surveyed and be fitted the same way as the main boilers, and have a water and steam gauge, and all other fittings complete, and as regards safety-valves, must comply with the same regulations as the main boilers.

24. No boilers or steam chamber is to be so constructed, fitted, or arranged so that the escape of steam from it through the safety-valve can be wholly, or partially, intercepted by the action of any other valve.

A stop-valve must always be fitted between the boiler and the steam pipe, and, where two or more boilers are connected with a steam receiver or superheater, between each boiler and the superheater or steam receiver. The object of this is obvious, viz., to avoid the failure of all the boilers through the failure of one. The necks of stop-valves should be as short as practicable.

25. Each boiler must be fitted with a glass water-gauge, at least two test cocks, and steam-gauge, that is to say, each boiler must be fitted with all fittings as complete as if there were only one boiler. When a factory has more than one boiler, and these boilers are fitted with stop-valves, each boiler must be treated as a separate one, and have all the requisite fittings.

26. On every inspection of a steam boiler the Inspector shall, if the boiler is large enough, go inside it, and make a thorough examination of it.

When the boilers are not large enough for the Inspector to get into, he should see them tested by hydraulic pressure at every annual inspection at least. The hydraulic test should also be applied at every inspection if the Inspector consider it necessary.

Whenever it is only removable stays that prevent getting in, he must order their removal, and he must see them properly replaced before granting his declaration.

If any part of a main boiler near the uptake fireboxes or furnaces is so constructed that the Inspector cannot examine it, he is not to give a declaration, but shall report the case to the Sanitary Engineer.

If for special reasons, and for special reasons only, the Inspector cannot go inside a small boiler, he must distinctly state on the face of his declaration his reasons for not being able to do so.

27. If the boiler is too hot for the Inspector to examine the inside efficiently, and with safety and convenience, he should decline to examine the boiler, and absolutely refuse to grant a certificate, until he can make an efficient internal examination.

28. Before testing a boiler the Inspector shall examine it, take the necessary measurements, and calculate what the working pressure should be in accordance with the regulations, and only test it with reference to that pressure in accordance with Rule 8. If the test is not satisfactory, the pressure must be proportionately reduced.

This course will enable any necessary alterations to be made by the owners and prevent delay or disappointment. The Inspector who grants the certificate should not increase the working pressure without first consulting the Sanitary Engineer.

The Inspector who grants the certificate must examine the boilers thoroughly, and, in the absence of special instructions from the Sanitary Engineer, will be held responsible for the pressure allowed.

29. The Inspector shall see all new boilers, and boilers that have been cleaned for a thorough repair, tested by hydraulic pressure, in accordance with Rule 8 previous to the boilers being set, and before they are covered in, to test the workmanship, &c.; but the working pressure is to be determined by the strength of stays, thickness of plates, and strength of riveting, &c., and not by the hydraulic test.

The hydraulic test should in no case exceed twice the calculated working pressure of the boiler, and it is never to be applied until the boiler has been examined and until the strength has been calculated from the necessary measurements taken from the boiler itself.

When the boilers are set the Inspector may, at any time he thinks it necessary, before he gives a certificate, have them tested by hydraulic pressure to satisfy himself as to any doubtful part, or of places not easy of access, care being taken in the case of old boilers not to overstrain them; but the test must always exceed the working pressure.

The hydraulic test should before a certificate is granted be applied to all boilers that have not previously had a working certificate.

When a boiler is partially inspected by one Inspector, and the inspection is completed and a certificate granted by another, if the Inspector who witnesses the test of the boiler by hydraulic pressure has an opportunity of examining it inside and outside after the test, such Inspector should determine the pressure to be allowed on the boiler in question, taking care to inform the makers, owners, or agents, and the Inspector who is ultimately to grant a certificate, what pressure should in his opinion be allowed on it. In the event of the original Inspectors having no opportunity to examine the boiler inside and out after the hydrostatic test, the Inspector must re-test the boiler by water and examine the boiler inside and out before determining the working pressure and granting a certificate.

The amount of the hydraulic pressure test, and the date on which it was last applied to the boiler, should be inserted in the Inspector's certificate, and recorded in the dimension sheet of that boiler.

Inspectors should pay particular attention to the examination and testing of steam pipes and economisers.

In all cases in which a socket expansion joint is fitted to a bent steam pipe, the Inspector should require a fixed gland and bolts to be fitted, in order to prevent the end of the pipe being forced out of the socket. This regulation should be complied with in all cases of bent pipes fitted with socket expansion joints. Fixed glands and bolts should be fitted to the expansion joints of straight steam pipes, as cases have occurred, particularly with small straight pipes, in which the ends of the pipes have been forced out of the sockets.

30. In all boilers in which the Inspector finds that cast iron is employed in such a manner as to be subject to the pressure of steam or water, he shall report the circumstances to the Sanitary Engineer, in order that he may obtain instructions how to act. Cast iron must not be used for stays, and the Inspector should discourage the use of cast iron saddles for boilers.

31. A pressure once allowed on a boiler is not, *under any circumstances whatever*, to be increased unless the Inspector has previously written for and obtained the sanction of the Sanitary Engineer.

In case the Inspector is of opinion that an increased pressure may with safety be allowed, he shall communicate with the Inspector who last inspected the boiler; and if on learning the reasons why the existing pressure was formerly allowed, the Inspector is still of opinion that it may be increased, he should communicate all the facts of the case to the Sanitary Engineer; but, as above stated, the pressure shall not in any case be increased until the question has been decided by him.

Safety-valves.

32. The Inspector is instructed that in all *new boilers*, and whenever *alterations can be easily made*, the safety-valve and stop-valve should be placed directly on the boiler; and the neck, or part between the valve and the flange which is bolted on to the boiler, should be as short as possible.

The Inspector should note that it is not intended by this instruction that old boilers which have been previously passed with such an arrangement should be thrown out of work for the alterations to be carried out.

Of course in any case in which the Inspector is of opinion that it is positively dangerous to have a length of pipe between the boilers and the safety-valve, it is his duty at once to insist on the requisite alterations being made before granting a declaration.

The Inspector shall declare, amongst other things, the limits of the weight to be placed on the safety-valves, and that the safety-valves are such and in such condition as the circumstances of the case demand.

33. The area per square foot of fire grate surface of safety-valves, or (when there is more than one safety-valve on the boiler) the combined area of the safety-valves should be not less than that given in the following tables opposite the boiler pressure intended, provided the valves are not less than two inches in diameter. This applies to new boilers which have not received a working certificate.

In ascertaining the fire grate area, the length of the grate should be measured from the inner edge of the dead plate to the front of the bridge, and the width from side to side of the furnace on the top of the bars at the middle of their length.

If there is only one safety-valve on a *main* boiler the Inspector should not grant a certificate without first referring the case to the Sanitary Engineer for special instructions.

In the case of small boilers, if it is wished to fit valves smaller than two inches diameter, the case should be submitted for the consideration of the Sanitary Engineer.

Safety-Valve Areas.

Boiler Pressure.	Area of Valve per square foot of Fire grate.	Boiler Pressure.	Area of Valve per square foot of Fire grate.	Boiler Pressure.	Area of Valve per square foot of Fire grate.
LB.	SQ. INCH.	LB.	SQ. INCH.	LB.	SQ. INCH.
15	1·250	77	·407	139	·243
16	1·209	78	·403	140	·241
17	1·171	79	·398	141	·240
18	1·136	80	·394	142	·238
19	1·102	81	·390	143	·237
20	1·071	82	·386	144	·235
21	1·041	83	·382	145	·234
22	1·013	84	·378	146	·232
23	·986	85	·375	147	·231
24	·961	86	·371	148	·230
25	·937	87	·367	149	·228
26	·914	88	·364	150	·227
27	·892	89	·360	151	·225
28	·872	90	·357	152	·224
29	·852	91	·353	153	·223
30	·833	92	·350	154	·221
31	·815	93	·347	155	·220
32	·797	94	·344	156	·219
33	·781	95	·340	157	·218
34	·765	96	·337	158	·216
35	·750	97	·334	159	·215
36	·735	98	·331	160	·214
37	·721	99	·328	161	·213
38	·707	100	·326	162	·211
39	·694	101	·323	163	·210
40	·681	102	·320	164	·209
41	·669	103	·317	165	·208
42	·657	104	·315	166	·207
43	·646	105	·312	167	·206
44	·635	106	·309	168	·204
45	·625	107	·307	169	·203
46	·614	108	·304	170	·202
47	·604	109	·302	171	·201
48	·595	110	·300	172	·200
49	·585	111	·297	173	·199
50	·576	112	·295	174	·198
51	·568	113	·292	175	·197
52	·559	114	·290	176	·196
53	·551	115	·288	177	·195
54	·543	116	·286	178	·194
55	·535	117	·284	179	·193
56	·528	118	·281	180	·192
57	·520	119	·279	181	·191
58	·513	120	·277	182	·190
59	·506	121	·275	183	·189
60	·500	122	·273	184	·188
61	·493	123	·271	185	·187
62	·487	124	·269	186	·186
63	·480	125	·267	187	·185
64	·474	126	·265	188	·184
65	·468	127	·264	189	·183
66	·462	128	·262	190	·182
67	·457	129	·260	191	·181
68	·451	130	·258	192	·181
69	·446	131	·256	193	·180
70	·441	132	·255	194	·179
71	·436	133	·253	195	·178
72	·431	134	·251	196	·177
73	·426	135	·250	197	·176
74	·421	136	·248	198	·176
75	·416	137	·246	199	·175
76	·412	138	·245	200	·174

34. The Inspector in his examination of the boilers and appurtenances is particularly to direct his attention to the safety-valves, and whenever he considers it necessary, he is to satisfy himself as to the pressure on the boiler by actual trial.

The Inspector is to fix the limits of the weight to be placed on the safety-valves, and the responsibility of issuing a certificate before he is fully satisfied on the point is very grave. The Inspector is to examine the whole of the valves, weights, and springs at every inspection

The responsibility of seeing to the efficiency of the mode by which the valves, are fitted so as to be as much as practicable under the control of the Engineer when steam is up, rests with the Inspector.

The safety-valve should be fitted with lifting gear, which should in all cases be arranged so that it can be worked by hand.

Care should be taken that the safety-valves have a lift equal to at least one-fourth their diameter; that the openings for the passage of steam to and from the valves, including the waste steam pipe, should each have an area not less than the area of valves required, and that each valve-box has a drain pipe fitted at its lower part. In the case of lever valves, if the lever is not bushed with brass, the pins must be of brass; iron and iron working together must not be passed. Too much care cannot be devoted to seeing that there is proper lift, and free means of escape of waste steam, as it is obvious that unless the lift and means for escape of waste steam are ample, the effect is the same as reducing the area of the valve or putting on an extra load. The valve seats should be secured by studs and nuts.

The Inspector shall, as far as is in his power, make these points generally known to the owners of steam boilers.

35. When the Inspector has determined the amount of pressure, he is to see the valves weighted accordingly and the weights or springs fixed in such a manner as to preclude the possibility of their shifting or in any way increasing the pressure. The limits of the weight on the valves is to be inserted in the declaration, and should it at any time come to the Inspector's knowledge that the weights or the loading of the valves have been shifted, or otherwise altered, or that the valves have been in any way interfered with, so as to increase the pressure, without the sanction of the Sanitary Engineer, he is at once to report the facts.

NOTIFICATION C.

Under sub-section (2) of section 3 of the Madras Steam-boilers and Prime-movers Act, III of 1893, the Government directs that the Inspectors appointed under the said Act shall exercise the powers and perform the duties conferred and imposed by or under this Act on an Inspector throughout the City of Madras.

NOTIFICATION D.

Under section 4 of the Madras Steam-boilers and Prime-movers Act, III of 1893, the Government fixes the 1st August 1897 as the date after which no boiler shall be used unless a license authorising its use has been granted under the Act, and is in force.

NOTIFICATION E.

(*a*) Under section 9 of the Madras Steam-boilers and Prime-movers Act, 1893, the Government prescribes the following form of register of boilers:—

Name of Owner.	Place where boiler is situated.	Registry number and description of boiler and age.	Nominal horse-power.	When, where and by whom made.	When and where last repaired.	Date of grant of license.	Maximum pressure at which boiler may be worked.	Time for which this license is to be in force.	Remarks.

(*b*) Under the same section the Government directs that the registry number of every boiler shall be cut in the front plate thereof in such position as shall be pointed out by the Inspector. The device to be so cut shall consist of the letters "RY" above the letters "No." and divided from them by a horizontal line; the letters "No." to be followed by the registry number in figures, the letters being at least one-half of an inch, and the figures at least one and a quarter inch, in height; the whole to be enclosed in a rectangular figure one-sixteenth of an inch clear from the letters and figures; thus—

RY. / No. 148.

The engraving shall be not less than one-sixty-fourth of an inch deep.

NOTIFICATION F.

Under section 11 of the Madras Steam-boilers and Prime-movers Act, 1893, the Government authorizes the Sanitary Engineer to revoke and suspend licenses granted in respect of boilers for the reasons therein given.

NOTIFICATION G.

1. Under section 12 (4) when the Chief Presidency Magistrate thinks fit to summon assessors to assist him, the appellant shall be permitted to nominate one assessor, and the Inspector the other, provided that if either of the assessors or both of them appears or appear to the Chief Presidency Magistrate to be incompetent, he may nominate one or both himself.

2. The opinions of the assessors shall be recorded and duly considered, but the decision of the appeal shall rest with the Chief Presidency Magistrate.

3. Assessors appointed under section 12 (4) and persons summoned to give evidence as "experts" when assessors are not appointed, shall be entitled to a fee of Rs. 15 for each day's attendance in Court.

NOTIFICATION H.

Under sub-section (5) of section 12 of the Madras Steam-boilers and Prime-movers Act, 1893, the Government prescribes the following as the form in which licenses shall be granted by the Chief Presidency Magistrate :—

License.

Name of owner.	Registry number and description of boiler and age.	Nominal horse-power.	When and where made.	When and where last repaired.	Time for which this license is to be in force.	Maximum pressure at which the boiler may be worked.	Remarks.

Certificate.

I, the undersigned, * being assisted by A and B, two competent assessors,* am satisfied that C is entitled to the above license and have granted it to him on this date under the provisions of section 12 (5) of Madras Act III of 1893; and I hereby direct the Inspector to register the boiler specified in the above license and to allot to it a registry number in accordance with section 9 of the said Act.

* The words between asterisks to be omitted when no assessors are employed.

(Signed) D E
Chief Presidency Magistrate.

(True Extract.)

Under Secretary to Government.

To all District Magistrates.
„ the Commissioner of Police, Madras.
„ the Judicial Department.
„ the Local and Municipal Department.
„ the Sanitary Engineer.
„ the Chief Presidency Magistrate.
„ the Government Solicitor.
„ the Accountant-General.
„ the Chamber of Commerce.
„ the Madras Trades Association.
„ the Gazette.

Exd. P. Seetharam.

His Excellency the Governor
The Hon'ble Blois C.I.E.
Steam Boilers Act
Print very urgent
No. 215 W of 23.1.1897

PUBLIC WORKS DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

READ the following

Letter from the Sanitary Engr. to Govt: & Inspector of Boilers (Ex-officio). — No. No. 3491 dy 17 Dec. 96
— do — do — " " 3495 dy 18 — do —

ordered that the following notifications be published in the Fort St. George Gazette :—

Notification. A

Whereas by notification published in the Fort St. George Gazette of the 4th August 1896 Part II page 949 it was declared that the introduction of the Madras Steam Boilers and Prime-movers Act III of 1893, shall be postponed

The date is in red ink round figure
Sufficient notice
J.S.H
21.1.97

H.C. 21/1/97
For Note for Press
Simultaneous in next Gazette
22 Jan 97

40—300—3-3-96.

postponed until further orders, it is now declared, under subsection (1) of section 1, that the said act shall come into force upon the 1st February 1897.

Notification - B

His Excellency the Governor-in-Council is pleased, in accordance with section 23 of the Madras Steam Boilers and Prime-movers act III of 1893, to make the following rules under the said act, and to declare that they shall come into force with effect from the 1st February 1897:-

A - Preliminary

26/1/97

The Boilers Inspector joined on the 18th January. The interval will be taken up in getting his office into order and mastering himself with the enactments.

~~License.~~

Name of owner.	~~Registry number and description of boiler and age.~~	~~Nominal horse-power.~~	~~When and where made.~~	~~When and where last repaired.~~	Time for which this license is to be in force.	~~Maximum pressure at which the boiler may be worked.~~	Remarks.

~~*Certificate.* I, the undersigned,* being assisted by A and B, two competent assessors,* am satisfied that C is entitled to the above license and have granted it to him on this date under the provisions of section 12 (5) of Madras Act III of 1893, and I hereby direct the Inspector to register the boiler specified in the above license and to allot to it a registry number in accordance with section 9 of the said Act.~~

~~(Signed) D. E.,~~
~~*Chief Presidency Magistrate.*~~

~~NOTIFICATION F.~~

~~The Government will be prepared to consider any suggestions in respect of the following draft rules under clauses (*a*), (*b*) and (*c*) of section 23 of the Madras Steam-boilers and Prime-movers Act, 1893, which are received on or before the 1st April 1895:—~~

A.—*Preliminary.*

1. These rules may be called the Boiler Examination Rules.
2. In these Rules—
   (*a*) "The Act" means the Madras Steam-boilers and Prime-movers Act, 1893;
   (*b*) "Section" means a section of the said Act;
   (*c*) "Examination" means the examination of boilers under the Act, and "examination fees" means fees leviable on account of the examination of boilers.

B.—*The Inspector.*

3. The Inspector shall not undertake any professional work unconnected with his business under the Act except with the approval, or under the orders, of Government.
4. The Inspector shall receive such salary as Government may determine, all examination fees being credited to Government.
5. The Inspector shall have an office in which all records connected with the working of the Act shall be kept.
6. The Inspector shall keep the following records:—
   (*a*) a register of examination fee receipts;
   (*b*) a book containing counterfoils of licenses;
   (*c*) a register of boilers in the following form which has been prescribed under section 9:—

Name of owner.	Place where boiler is situated.	Registry number and description of boiler and age.	Nominal horse power.	When, where and by whom made.	When and where last repaired.	Date of grant of license.	Maximum pressure at which boiler may be worked.	Time for which this license is to be in force.	Remarks.

* The words between asterisks to be omitted when no assessors employed.

(*d*) a book containing a detailed account of every examination made by him;
(*e*) a diary of the work done by him from day to day;
(*f*) a register of licenses suspended or revoked under section 11 (this register to be prepared upon information furnished to the Inspector by the suspending or revoking authority, *i.e*, the Sanitary Engineer);
(*g*) a register showing the result of appeals presented under section 12 (this register to be prepared upon information furnished to the Inspector by the Chief Presidency Magistrate).

7. The Inspector shall furnish to the Sanitary Engineer, on the third working day of every month, a copy of his diary for the preceding month.

8. All examination fees shall be paid into the Madras Bank by the owners of boilers and no boiler shall be examined under section 5 unless the notice sent to the Inspector under that section is accompanied by a Bank receipt for the fee; and the Inspector, if he finds that the right fee has not been paid, may decline to examine the boiler until it has been paid.

9. An extract from the register of examination fee receipts which is compiled by the Inspector from the Bank receipts referred to in Rule 8 shall be forwarded by him, monthly, to the Accountant-General who shall verify it by reference to the amount actually received on account of examination fees during the month to which the extract relates and forward it to the Sanitary Engineer for record.

10. The Inspector shall be subordinate to the Sanitary Engineer and shall obey all lawful orders issued to him by that officer.

C.—Examinations.

11. Examination fees shall be paid in accordance with the following scale:—

								RS.
(i)	For the examination of each boiler not exceeding				10	N.H.P.	..	12
(ii)	,,	,,	,,	,,	20	,,	..	16
(iii)	,,	,,	,,	,,	30	,,	..	24
(iv)	,,	,,	,,	,,	50	,,	..	32
(v)	,,	,,	,,	boiler exceeding	50	,,	..	40

12. Examinations will not be made on Sundays except in cases of absolute necessity; in such cases the fees may be increased 25 per cent., the Inspector and his staff being allowed to divide the additional fee amongst them in proportion to their pay.

Iron Boilers.

13. The Inspector is required by the Act to fix the pressure to be allowed on boilers. In performing this very responsible and onerous duty he must be very careful, as in the event of accident it will be necessary for him to prove clearly that he used due caution. On the one hand he must be careful as regards safety, and on the other hand he must not unduly reduce the pressure on a boiler.

14. The Inspector should fix the working pressure for boilers by a series of calculations of the strength of the various parts, and according to the workmanship and material.

In the case of boilers made in India, the Inspector may receive and examine plans and particulars of boilers before the commencement of manufacture with the object of preventing questions arising after the boilers are finished.

When the Inspector has received plans and tracings of new boilers, or of alterations of boilers, and has approved of them, he will of course be careful in making his examination, when the boiler is ready for work, to see that they have been followed out. When he has not had the plans submitted, but is called in to inspect a boiler, he will of course measure the parts, note the details of construction, and, if necessary, bore the plates to ascertain their thickness, &c., before he gives his certificate.

The Inspector shall not declare a boiler to be safe unless (*a*) he is fully informed as to its construction, material and workmanship, or unless (*b*) he is furnished with a certificate from a Chief Engineer of a recognised boiler insurance company. He should therefore be very careful how he ventures to give a certificate.

15. In the case of new boilers the Inspector may allow a stress not exceeding 7,000 lb. per square inch of net section on solid iron screwed stays supporting flat surfaces, but the stress should not exceed 5,000 lb. when the stays have been welded or worked in the fire.

The areas of diagonal stays are found in the following way: Find the area of a direct stay needed to support the surface, multiply this area by the length of the diagonal stay, and divide the product by the length of a line drawn at right angles to the surface supported to the end of the diagonal stay; the quotient will be the area of the diagonal stay required.

When gusset stays are used, their area should be in excess of that found in the above way.

16. When the tops of combustion boxes or other parts of a boiler are supported by solid rectangular girders the following formula should be used for finding the working pressure to be allowed on the girders, assuming that they are not subjected to a greater temperature than the ordinary heat of steam, and in the case of combustion chambers that the ends are fitted to the edges of the tube plate and the back plate of the combustion box.

$$\frac{C \times d^2 \times T}{(W-P)\,D \times L} = \text{Working Pressure.}$$

W = Width of combustion box in inches.
P = Pitch of supporting bolts in inches.
D = Distance between the girders from centre to centre in inches.
L = Length of girder in feet.
D = Depth of girder in inches.
T = Thickness of girder in inches.
C = 500 when the girder is fitted with one supporting bolt.
C = 750 when the girder is fitted with two or three supporting bolts.
C = 850 when the girder is fitted with four supporting bolts.

The working pressure for the supporting bolts and for the plate between them should be determined by the rule for ordinary stays.

17. The pressure on plates forming flat surfaces is found by the following formula:—

$$\frac{C \times (T+1)^2}{S-6} = \text{Working Pressure.}$$

T = Thickness of the plate in sixteenths of an inch.
S = Surface supported in square inches.
C = Constant according to the following circumstances.
C = 100 when the plates are not exposed to the impact of heat or flame, and the stays are fitted with nuts and washers, the latter being at least three times the diameter of the stay and two-thirds the thickness of the plates they cover.*
C = 90 when the plates are not exposed to the impact of heat or flame, and the stays are fitted with nuts only.
C = 60 when the plates are exposed to the impact of heat or flame, and steam in contact with the plates, and the stays fitted with nuts and washers, the latter being at least three times the diameter of the stay and two-thirds the thickness of the plates they cover.
C = 54 when the plates are exposed to the impact of heat or flame, and steam in contact with the plates, and the stays fitted with nuts only.
C = 80 when the plates are exposed to the impact of heat or flame with water in contact with the plates, and the stays screwed into the plates and fitted with nuts.
C = 60 when the plates are exposed to the impact of heat or flame, with water in contact with the plates, and the stays screwed into the plates, having the ends riveted over to form substantial heads.
C = 36 when the plates are exposed to the impact of heat or flame, and steam in contact with the plates, with the stays screwed into the plates, and having the ends riveted over to form substantial heads.

In cases where plates are stiffened by T or L irons, and a greater pressure is required for the plates than is allowed by the use of the above constants, the case should be submitted for the consideration of the Sanitary Engineer.

When the riveted ends of screwed stays are much worn or when the nuts are burned, the constants should be reduced, but the Inspector must act according to the circumstances that present themselves at the time of inspection, and it is expected that in cases where the riveted ends of screwed stays in the combustion boxes and furnaces are found in this state, it will be often necessary to reduce the constant 60 to about 36.

The Inspector should not in any case allow a greater compressive stress on the edge of the tube plates than 7,500 lb. per square inch, which is that used in the following formula:—

$$\frac{(D-d)\,T \times 15{,}000}{W \times D} = \text{Working Pressure.}$$

D = least horizontal distance between centres of tubes in inches.
d = inside diameter of ordinary tubes in inches.
T = thickness of tube plate in inches.
W = extreme width of combustion box in inches from front of tube plate to back of fire-box, or distance between combustion box tube plates when boiler is double ended and the box common to the furnaces at both ends.

18. The Inspector should take care that boilers, the outside of which cannot be seen, are cleared of all covering and fittings for inspection whenever the Inspector considers it necessary. It will often be found necessary to reduce the pressure, unless the boilers are partially cleared from their seats to enable the Inspector to judge of their condition. If the owners in any special case have any good reasons for not wishing to clear them when the Inspector requires it, the Inspector should submit the whole case in detail to the Sanitary Engineer for his consideration. The Inspector must recollect that he is not to certify as sufficient any boiler respecting which he cannot thoroughly satisfy himself.

The Inspector should record in his inspection book the dates on which boilers are inspected, when and to what extent cleared from brick work, and whether the boilers were set or not when

* If the diameter of riveted washers be at least two-thirds the pitch of the stays, and the thickness not less than the plates they cover, the constant may be increased to 150.
When doubling plates are fitted of the same thickness as the plates they cover and not less in width than two-thirds the pitch of the stays, the constant may be increased to 160.

examined, and if not set, where they were examined. Boilers which have been cleared should in all cases be subjected to the hydraulic test before the brick work is rebuilt.

19. Boilers well constructed, well designed, and made of good material should have an advantage in the matter of working pressure over boilers inferior in any of the above respects, as unless this is done the superior boiler is placed at a disadvantage, and good workmanship and material will be discouraged. The following rules are therefore prescribed.

When cylindrical boilers are made of the best material with all the rivet holes drilled in place and all the seams fitted with double butt straps each of at least five-eighths the thickness of the plates they cover, and all the seams at least double riveted with rivets having an allowance of not more than 75 per cent. over the single shear and provided that the boilers have been open to inspection during the whole period of construction, then 5 may be used as the factor of safety. The tensile strength of the iron is to be taken as equal to 47,000 lb. per square inch with the grain, and 40,000 lb. across the grain. But when the above conditions are not complied with, the additions in the following scale must be added to the factor 5, according to the circumstances of each case:—

A †	·15	To be added when all the holes are fair and good in the longitudinal seams, but drilled out of place after bending.
B †	·3	To be added when all the holes are fair and good in the longitudinal seams, but drilled out of place before bending.
C	·3	To be added when all the holes are fair and good in the longitudinal seams, but punched after bending instead of drilled.
D	·5	To be added when all the holes are fair and good in the longitudinal seams, but punched before bending.
E *	·75	To be added when all the holes are not fair and good in the longitudinal seams.
F	·1	To be added if the holes are all fair and good in the circumferential seams, but drilled out of place after bending.
G †	·15	To be added if the holes are fair and good in the circumferential seams, but drilled before bending.
H	·15	To be added if the holes are fair and good in the circumferential seams, but punched after bending.
I †	·2	To be added if the holes are fair and good in the circumferential seams, but punched before bending.
J *	·2	To be added if the holes are not fair and good in the circumferential seams.
K	·2	To be added if double butt straps are not fitted to the longitudinal seams, and the said seams are lap and double riveted.
L	·1	To be added if double butt straps are not fitted to the longitudinal seams, and the said seams are lap and treble riveted.
M	·3	To be added if only single butt straps are fitted to the longitudinal seams and the said seams are double riveted.
N	·15	To be added if only single butt straps are fitted to the longitudinal seams and the said seams are treble riveted.
O	·1	To be added when any description of joint in the longitudinal seams is single riveted.
P	·1	To be added if the circumferential seams are fitted with single butt straps and are double riveted.
Q	·2	To be added if the circumferential seams are fitted with single butt straps and are single riveted.
R	·1	To be added if the circumferential seams are fitted with double butt straps and are single riveted.
S	·1	To be added if the circumferential seams are lap joints and are double riveted.
T	·2	To be added if the circumferential seams are lap joints and are single riveted.
U	·25	To be added when the circumferential seams are lap, and the stakes of plates are not entirely under or over.
V ‡	·3	To be added when the boiler is of such a length as to fire from both ends, or is of unusual length, as in the case of flue boilers; and the circumferential seams fitted as described opposite P, R, and S, but of course when the circumferential seams are as described opposite Q and T, V ·3 will become V ·4.
W *	·4	To be added if the seams are not properly crossed.
X *	·4	To be added when the iron is in any way doubtful, and the Inspector is not satisfied that it is of the best quality.
Y ††	1·65	To be added if no certificate is produced from a Chief Engineer of a recognized Boiler Insurance Company or if the boiler was not open to inspection during the whole period of its construction by the Inspectors of any recognized Boiler Insurance Company.

Where marked * the factor of safety should be increased still further if the workmanship or material is very doubtful or is very unsatisfactory.

† When the holes are to be rimered, or bored out in place, the case should be submitted to the Sanitary Engineer as to the reduction or omission of A, B, G, and I as heretofore.

‡ When boilers are comparatively short, the cases should be submitted to the Sanitary Engineer for consideration as to the omission of V as heretofore.

When the circumferential seams are double strapped and double riveted or lapped and treble riveted, and the calculated strength not less than 65 per cent. of the solid plate V, ·3 may be omitted as heretofore.

The strength of ordinary joints is found by the following method:—

$$\frac{(\text{Pitch} - \text{Diameter of rivet}) \times 100}{\text{Pitch}} = \left\{ \text{Percentage of strength of plate at joint as compared with the solid plate.} \right.$$

$$\frac{(\text{Area of rivet} \times \text{No. of rows of rivets}) \times 100}{\text{Pitch} \times \text{thickness of plate}} = \left\{ \text{Percentage of strength of rivets as compared with the solid plate.}^{*} \right.$$

Then take iron as equal to 47,000 lb. per square inch and use the smaller of the two percentages as the strength of the joint, and adopt the factor of safety as found from the preceding scale.

$$\frac{(47{,}000 \times \text{percentage of strength of joint}) \times \text{twice the thickness of the plate in inches.}}{\text{Inside diameter of the boiler in inches} \times \text{factor of safety}} = \text{Pressure to be allowed per square inch on the safety-valves.}$$

In the case of ordinary zigzag riveting the strength through the plate diagonally between the rivets, when diagonal pitch $= \frac{6}{10}$ horizontal pitch $+ \frac{4}{10}$ diameter of rivet.

Plates that are drilled in place must have been taken apart and the burr taken off and the holes slightly countersunk from the outsides.

Butt straps must have been cut from plates and not from bars, and must be of as good a quality as the shell plates, and for the longitudinal seams must be cut across the fibre. The rivet holes may have been punched or drilled when the plates are punched or drilled out of place, but when drilled in place must have been taken apart and the burr taken off and slightly countersunk from the outside.

When single butt straps are used and the rivet holes in them punched, they must be one-eighth thicker than the plates they cover.

The diameter of the rivets must not be less than the thickness of the plates of which the shell is made, but it will be found when the plates are thin, or when lap joints or single butt straps are adopted, that the diameter of the rivets should be in excess of the thickness of the plates.

Dished ends must be stayed as flat surfaces; but when they are theoretically equal to the pressure needed, when considered as portions of spheres, the stays when solid may have a stress of 14,000 lb. per square inch of net section, but the stress should not exceed 10,000 lb. when the stays have been welded or worked in the fire.

Truly hemispherical ends subjected to internal pressure may be allowed double the pressure that is suitable for a cylinder of the same diameter and thickness.

All man-holes and openings must be stiffened with compensating rings of at least the same effective sectional area as the plates cut out, and in no case should the plate rings be less in thickness than the plates to which they are attached. The openings in the shells of cylindrical boilers should have their shorter axes placed longitudinally. It is very desirable that the compensating rings round openings in flat surfaces be made of L or T iron. Cast-iron doors are not to be passed.

The neutral part of boiler shells under steam domes must be efficiently stiffened and stayed, as serious accidents have arisen from the want of such precautions.

20. New boilers are to be tested by hydraulic pressure according to the following scale:—

Boilers intended to work up to 100 lb. pressure per square inch or any pressure below that, are to be tested to double the working pressure.

Above	lb. 100	up to	lb. 125	to be tested to lb.	200.
,,	125	,,	150	,,	230.
,,	150	,,	175	,,	250.
,,	175	,,	200	,,	270.
,,	200	,,	225	,,	290.
,,	225	,,	250	,,	310.
,,	250	,,	275	,,	330.
,,	275	,,	300	,,	350.

Any boilers intended for working pressure above these to be tested to not less than 50 lb. above such working pressure.

In the case of old boilers the Inspector must use his own judgment as to the necessary pressure to be applied.

21. Circular furnaces with the longitudinal joints welded or made with a butt strap.

$$\frac{90{,}000 \times \text{the square of the thickness of the plate in inches}}{(\text{Length in feet} + 1) \times \text{diameter in inches}}$$

= working pressure per square inch, provided it does not exceed that found by the following formula:—

$$\frac{8{,}000 \times \text{thickness in inches}}{\text{diameter in inches.}} = \left\{ \text{Working pressure per square inch.} \right.$$

The second formula limits the crushing stress on the material to 4,000 lb per square inch.

The length is to be measured between the rings if the furnace is made with rings.

If the longitudinal joints instead of being butted are lap-jointed in the ordinary way, then 75,000 is to be used instead of 90,000, excepting only where the lap is bevelled and so made as to give the flues the form of a *true* circle, when 80,000 may be used.

* If the rivets are exposed to double shear, multiply the percentage as found by 1·75.

When the material or the workmanship is not of the best quality, the constants given above must be reduced, that is to say, the 90,000 will become 80,000, the 80,000 will become 70,000, the 70,000 will become 60,000; when neither the material nor the workmanship is of the best quality, such constants will require to be further reduced, according to circumstances and the judgment of the Inspector, as in the case of old boilers. One of the conditions of best workmanship is that the joints are double riveted with double butt straps, or single riveted with double butt straps, and the holes drilled after the bending is done and when in place and the plates afterwards taken apart, the burr on the holes taken off and the holes slightly countersunk from the outside.*

The working pressure for corrugated furnaces, practically circular and machine made, provided the plane parts at the ends do not exceed 6 inches in length, and the plates are not less than $\frac{5}{16}$ inch thick, should not be greater than found by the following formula :—

$$\frac{9{,}000 \times \text{thickness in inches}}{\text{Mean diameter in inches}} = \left.\right\} \text{Working pressure per square inch.}$$

Steel Boilers.

22. For steel boilers the rules for iron boilers may be increased as follows :—

The constants for flat surfaces when they are supported by stays screwed into the plate and riveted, 10 per cent. The constants for flat surfaces when they are supported by stays screwed into the plate and nutted, or when the stays are nutted in the steam space, 25 per cent. This is also applicable to the constants for flat surfaces stiffened by riveted washers or doubling strips, and supported by nutted stays.

The constants for combustion box girders, 10 per cent.

Boilers—General.

23. Small boilers must be surveyed and be fitted the same way as the main boilers, and have a water and steam gauge, and all other fittings complete, and as regards safety valves, must comply with the same regulations as the main boilers.

24. No boilers or steam chamber is to be so constructed, fitted, or arranged so that the escape of steam from it through the safety-valve can be wholly, or partially, intercepted by the action of any other valve.

A stop valve must always be fitted between the boiler and the steam pipe, and, where two or more boilers are connected with a steam receiver or superheater, between each boiler and the superheater or steam receiver. The object of this is obvious, viz., to avoid the failure of all the boilers through the failure of one. The necks of stop valves should be as short as practicable.

25. Each boiler must be fitted with a glass water-gauge, at least two test cocks, and steam-gauge, that is to say, each boiler must be fitted with all fittings as complete as if there were only one boiler. When a factory has more than one boiler, and these boilers are fitted with stop-valves, each boiler must be treated as a separate one, and have all the requisite fittings.

26. On every inspection of a steam boiler the Inspector shall, if the boiler is large enough, go inside it, and make a thorough examination of it.

When the boilers are not large enough for the Inspector to get into, he should see them tested by hydraulic pressure at every annual inspection at least. The hydraulic test should also be applied at every inspection if the Inspector consider it necessary.

Whenever it is only removable stays that prevent getting in, he must order their removal, and he must see them properly replaced before granting his declaration.

If any part of a main boiler near the uptake fireboxes or furnaces is so constructed that the Inspector cannot examine it, he is not to give a declaration, but shall report the case to the Sanitary Engineer.

If for special reasons, and for special reasons only, the Inspector cannot go inside a small boiler, he must distinctly state on the face of his declaration his reasons for not being able to do so.

27. If the boiler is too hot for the Inspector to examine the inside efficiently, and with safety and convenience, he should decline to examine the boiler, and absolutely refuse to grant a certificate, until he can make an efficient internal examination.

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* The following examples will serve to show the application of the constants for the different cases that may arise :—

Furnaces with butt joints and drilled rivet holes—

90,000	where the longitudinal seams are welded.						
90,000	,,	,,	,,	double	riveted and fitted with	single	butt straps.
80,000	,,	,,	,,	single	,,	single	,,
90,000	,,	,,	,,	,,	,,	double	,,

Furnaces with butt joints and punched rivet holes—

85,000	where the longitudinal seams are double riveted and fitted with single butt straps.						
75,000	,,	,,	,,	single	,,	single	,,
85,000	,,	,,	,,	,,	,,	double	,,

Furnaces with lapped joints and drilled rivet holes—

80,000	where the longitudinal seams are double riveted and bevelled.					
70,000	,,	,,	,,	,,	,,	and not bevelled.
70,000	,,	,,	,,	single	,,	and bevelled.
65,000	,,	,,	,,	,,	,,	and not bevelled.

Furnaces with lapped joints and punched rivet holes—

75,000	where the longitudinal seams are double riveted and bevelled.					
70,000	,,	,,	,,	,,	,,	and not bevelled.
65,000	,,	,,	,,	single	,,	and bevelled.
60,000	,,	,,	,,	,,	,,	and not bevelled.

In the case of upright fireboxes of donkey or similar boilers, 10 per cent. should be deducted from the constants given above, applicable to the respective classes of work.

28. Before testing a boiler the Inspector shall examine it, take the necessary measurements, and calculate what the working pressure should be in accordance with the regulations, and only test it with reference to that pressure in accordance with Rule 8. If the test is not satisfactory, the pressure must be proportionately reduced.

This course will enable any necessary alterations to be made by the owners and prevent delay or disappointment. The Inspector who grants the certificate should not increase the working pressure without first consulting the Sanitary Engineer.

The Inspector who grants the certificate must examine the boilers thoroughly, and in the absence of special instructions from the Sanitary Engineer, will be held responsible for the pressure allowed.

29. The Inspector shall see all new boilers, and boilers that have been cleaned for a thorough repair, tested by hydraulic pressure, in accordance with Rule 8 previous to the boilers being set, and before they are covered in, to test the workmanship, &c.; but the working pressure is to be determined by the strength of stays, thickness of plates, and strength of riveting, &c., and not by the hydraulic test.

The hydraulic test should in no case exceed twice the calculated working pressure of the boiler, and it is never to be applied until the boiler has been examined and until the strength has been calculated, from the necessary measurements taken from the boiler itself.

When the boilers are set the Inspector may, at any time he thinks it necessary, before he gives a certificate, have them tested by hydraulic pressure to satisfy himself as to any doubtful part, or of places not easy of access, care being taken in the case of old boilers not to overstrain them; but the test must always exceed the working pressure.

The hydraulic test should before a certificate is granted be applied to all boilers that have not previously had a working certificate.

When a boiler is partially inspected by one Inspector, and the inspection is completed and a certificate granted by another, if the Inspector who witnesses the test of the boiler by hydraulic pressure has an opportunity of examining it inside and outside after the test, such Inspector should determine the pressure to be allowed on the boiler in question, taking care to inform the makers, owners, or agents, and the Inspector who is ultimately to grant a certificate, what pressure should in his opinion be allowed on it. In the event of the original Inspectors having no opportunity to examine the boiler inside and out after the hydrostatic test, the Inspector must re-test the boiler by water and examine the boiler inside and out before determining the working pressure and granting a certificate.

The amount of the hydraulic pressure test, and the date on which it was last applied to the boiler, should be inserted in the Inspector's certificate, and recorded in the dimension sheet of that boiler.

Inspectors should pay particular attention to the examination and testing of steam pipes and economisers.

In all cases in which a socket expansion joint is fitted to a bent steam pipe, the Inspector should require a fixed gland and bolts to be fitted, in order to prevent the end of the pipe being forced out of the socket. This regulation should be complied with in all cases of bent pipes fitted with socket expansion joints. Fixed glands and bolts should be fitted to the expansion joints of straight steam pipes, as cases have occurred, particularly with small straight pipes, in which the ends of the pipes have been forced out of the sockets.

30. In all boilers in which the Inspector finds that cast iron is employed in such a manner as to be subject to the pressure of steam or water, he shall report the circumstances to the Sanitary Engineer, in order that he may obtain instructions how to act. Cast iron must not be used for stays, and the Inspector should discourage the use of cast iron saddles for boilers.

31. A pressure once allowed on a boiler is not, *under any circumstances whatever*, to be increased unless the Inspector has previously written for and obtained the sanction of the Sanitary Engineer.

In case the Inspector is of opinion that an increased pressure may with safety be allowed, he shall communicate with the Inspector who last inspected the boiler; and if on learning the reasons why the existing pressure was formerly allowed, the Inspector is still of opinion that it may be increased, he should communicate all the facts of the case to the Sanitary Engineer; but, as above stated, the pressure shall not in any case be increased until the question has been decided by him.

Safety-valves.

32. The Inspector is instructed that in all *new boilers*, and whenever *alterations can be easily made*, the safety-valve and stop valve should be placed directly on the boiler; and the neck, or part between the valve and the flange which is bolted on to the boiler, should be as short as possible.

The Inspector should note that it is not intended by this instruction that old boilers which have been previously passed with such an arrangement should be thrown out of work for the alterations to be carried out.

Of course in any case in which the Inspector is of opinion that it is positively dangerous to have a length of pipe between the boilers and the safety-valve, it is his duty at once to insist on the requisite alterations being made before granting a declaration.

The Inspector shall declare, amongst other things, the limits of the weight to be placed on the safety-valves, and that the safety-valves are such and in such condition as the circumstances of the case demand.

33. The area per square foot of fire grate surface of safety-valves, or (when there is more than one safety-valve on the boiler) the combined area of the safety-valves should be not less than that given in the following tables opposite the boiler pressure intended, provided the valves are not less than two inches in diameter. This applies to new boilers which have not received a working certificate.

In ascertaining the fire grate area, the length of the grate should be measured from the inner edge of the dead plate to the front of the bridge, and the width from side to side of the furnace on the top of the bars at the middle of their length.

If there is only one safety-valve on a *main* boiler the Inspector should not grant a certificate without first referring the case to the Sanitary Engineer for special instructions.

In the case of small boilers, if it is wished to fit valves smaller than two inches diameter, the case should be submitted for the consideration of the Sanitary Engineer.

Safety-Valve Areas.

Boiler Pressure.	Area of Valve per square foot of Fire grate.	Boiler Pressure.	Area of Valve per square foot of Fire grate.	Boiler Pressure.	Area of Valve per square foot of Fire grate.
LB.	SQ. INCH.	LB.	SQ. INCH.	LB.	SQ. INCH.
15	1·250	77	·407	139	·243
16	1·209	78	·403	140	·241
17	1·171	79	·398	141	·240
18	1·136	80	·394	142	·238
19	1·102	81	·390	143	·237
20	1·071	82	·386	144	·235
21	1·041	83	·382	145	·234
22	1·013	84	·378	146	·232
23	·986	85	·375	147	·231
24	·961	86	·371	148	·230
25	·937	87	·367	149	·228
26	·914	88	·364	150	·227
27	·892	89	·360	151	·225
28	·872	90	·357	152	·224
29	·852	91	·353	153	·223
30	·833	92	·350	154	·221
31	·815	93	·347	155	·220
32	·797	94	·344	156	·219
33	·781	95	·340	157	·218
34	·765	96	·337	158	·216
35	·750	97	·334	159	·215
36	·735	98	·331	160	·214
37	·721	99	·328	161	·213
38	·707	100	·326	162	·211
39	·694	101	·323	163	·210
40	·681	102	·320	164	·209
41	·669	103	·317	165	·208
42	·657	104	·315	166	·207
43	·646	105	·312	167	·206
44	·635	106	·309	168	·204
45	·625	107	·307	169	·203
46	·614	108	·304	170	·202
47	·604	109	·302	171	·201
48	·595	110	·300	172	·200
49	·585	111	·297	173	·199
50	·576	112	·295	174	·198
51	·568	113	·292	175	·197
52	·559	114	·290	176	·196
53	·551	115	·288	177	·195
54	·543	116	·286	178	·194
55	·535	117	·284	179	·193
56	·528	118	·281	180	·192
57	·520	119	·279	181	·191
58	·513	120	·277	182	·190
59	·506	121	·275	183	·189
60	·500	122	·273	184	·188
61	·493	123	·271	185	·187
62	·487	124	·269	186	·186
63	·480	125	·267	187	·185
64	·474	126	·265	188	·184
65	·468	127	·264	189	·183
66	·462	128	·262	190	·182
67	·457	129	·260	191	·181
68	·451	130	·258	192	·181
69	·446	131	·256	193	·180
70	·441	132	·255	194	·179
71	·436	133	·253	195	·178
72	·431	134	·251	196	·177
73	·426	135	·250	197	·176
74	·421	136	·248	198	·176
75	·416	137	·246	199	·175
76	·412	138	·245	200	·174

34. The Inspector in his examination of the boilers and appurtenances is particularly to direct his attention to the safety-valves, and whenever he considers it necessary, he is to satisfy himself as to the pressure on the boiler by actual trial.

The Inspector is to fix the limits of the weight to be placed on the safety-valves, and the responsibility of issuing a certificate before he is fully satisfied on the point is very grave. The Inspector is to examine the whole of the valves, weights, and springs at every inspection.

The responsibility of seeing to the efficiency of the mode by which the valves are fitted so as to be as much as practicable under the control of the Engineer when steam is up, rests with the Inspector.

The safety-valve should be fitted with lifting gear, which should in all cases be arranged so that it can be worked by hand.

Care should be taken that the safety-valves have a lift equal to at least one-fourth their diameter; that the openings for the passage of steam to and from the valves, including the waste steam pipe, should each have an area not less than the area of valves required, and that each valve-box has a drain pipe fitted at its lower part. In the case of lever valves, if the lever is not bushed with brass, the pins must be of brass; iron and iron working together must not be passed. Too much care cannot be devoted to seeing that there is proper lift, and free means of escape of waste steam, as it is obvious that unless the lift and means for escape of waste steam are ample, the effect is the same as reducing the area of the valve or putting on an extra load. The valve seats should be secured by studs and nuts.

The Inspector shall, as far as is in his power, make these points generally known to the owners of steam boilers.

35. When the Inspector has determined the amount of pressure, he is to see the valves weighted accordingly and the weights or springs fixed in such a manner as to preclude the possibility of their shifting or in any way increasing the pressure. The limits of the weight on the valves is to be inserted in the declaration, and should it at any time come to the Inspector's knowledge that the weights or the loading of the valves have been shifted, or otherwise altered, or that the valves have been in any way interfered with, so as to increase the pressure, without the sanction of the Sanitary Engineer, he is at once to report the facts.

D. MacNeil Campbell.
Colonel, R.E.,
Secretary to Government,

ACQUISITION OF LANDS.

Fort St. George, July 8, 1895.

Under section 6, Act I of 1894, the Right Honourable the Governor in Council hereby declares that the land mentioned in the following schedule and measuring 0·97 acre, be the same a little more or less, is needed for a public purpose, to wit, for constructing an Inspection bungalow and out-houses at Porumamilla, Badvel taluk, Sagileru project; and, under sections 3 and 7 of the same Act, the General-charge Deputy Collector, Siddhavattam Division, is appointed to perform the functions of a Collector under the Act and directed to take order for the acquisition of the said land:—

SCHEDULE.

Description of land, wet or dry, inam or poramboke, with survey or paimash number.	Name of owner or occupier.	Boundaries of the land required to be taken up.	Extent to be taken up.
Cuddapah District, Badvel Taluk, Porumamilla Village.			
Circar dry, No. 3 ..	Desoy: Chennamnah and Subbakka.	North, No. 6. East, No. 2. South, No. 6. West, No. 7.	Acres. 0·97

Under section 6, Act I of 1894, the Right Honourable the Governor in Council hereby declares that the land mentioned in the following schedule and measuring 23·60 acres, be the same a little more or less, is needed for a public purpose, to wit, for the lands flooded above the Rallavanka anicut; and, under sections 3 and 7 of the same Act, the Head-quarter Deputy Collector of Cuddapah is appointed to perform the functions of a Collector under the Act and directed to take order for the acquisition of the said land:—

SCHEDULE.

Description of land, wet or dry, inam or poramboke, with survey or paimash number.	Name of owner or occupier.	Boundaries of the land required to be taken up.	Extent to be taken up.
Cuddapah District, Cuddapah Taluk, Sivotriem Ramarazupallai Village.			
Dry, unsurveyed portion shrotriem. No number is given as there is no paimash for this village.	Khajee Syed Mustafa Hussain Sahib.	North, Bellary civil road. East, Madras Railway north-west line. South, Ramarazupallai shrotriem. West, Venkatareddipalli, hamlet of Ramarazupallai, and cultivated lands therein situated.	Acres. 23·60

Notification – C

notification—C

Under section 6, Act I of 1894, the Right Honourable the Governor in Council hereby declares that the land mentioned in the following schedule and measuring 22·78 acres, be the same a little more or less, is needed for a public purpose, to wit, for the 15th distributary of the Rushikulya canal, Rushikulya project; and, under sections 3 and 7 of the same Act, the Special Deputy Collector, Ganjam, is appointed to perform the functions of a Collector under the Act and directed to take order for the acquisition of the said land:—

SCHEDULE.

Description of land, wet or dry, inam or poramboke, with survey or paimash number.	Name of owner or occupier.	Boundaries of the land required to be taken up.	Extent to be taken up.
		Ganjam District, Berhampur Taluk, Jarapukali Village.	Acs.
Jeroyati, dry, survey No. 48 A.	Gonga Naiko and Sonya Naiko.	North, survey No. 48 A. East, survey No. 207-1. South, survey No. 48 A. West, survey No. 48 B.	·42
Do. No. 207-2.	Nakkalapati Audinarayana ..	North, survey No. 207-2. East, Chikilikhandi lands. South, survey No. 207-2. West, survey No. 207-1.	·12
		Total ..	·54
		Chikilikhandi Village.	
Jeroyati, tope, survey No. 708 B.	Nakkalapati Audinarayana ..	North, survey No. 708 B. East, survey No. 708 D. South, survey No. 708 B. West, Jarapukali lands.	·10
Jeroyati, dry, survey No. 711.	Do. ..	North, survey No. 711. East, survey No. 712. South, survey No. 711. West, survey No. 708 D.	·35
Do. No. 712..	Do. ..	North, survey No. 711. East, survey No. 712. South, survey No. 713. West, survey No. 712.	·37
Do. No. 713..	Rapakula Jaggaiya, Rapakula Surianaraina, Rapakula Mahalakshmi and Rapakula Venkataswamy.	North, survey No. 712. East, survey No. 713. South, survey No. 732. West, survey No. 713.	·19
Do. No. 733-1.	Vakada Kannama	North, survey No. 732. East, survey No. 733-1. South, survey No. 735. West, survey No. 733-1.	·50
Do. No. 733-2.	Do. ..	North, survey No. 733-1. East, survey No. 733-2. South and west, survey No. 733-1.	·02
Do. No. 735-1.	Samudi Kamaiya, Mondi Rangaiya and Mondi Chinnaiya.	North, survey No. 735-1. East, survey No. 733. South, survey No. 735-1. West, survey No. 893-2.	·19
Do. No. 735-2.	Do. Modi Rangaiya ..	North and east, survey No. 735-1. South, survey No. 735-2. West, survey Nos. 735-3 and 893-2.	·09
Do. No. 735-3.	Samudi Kamaiya	North and east, survey No. 735-2. South, survey No. 735-3. West, survey No. 893-2.	·02
Do. No. 697..	Narasinga Naiko, Satyavadi Naiko, Govardhana Naiko and Bonamali Naiko.	North, survey No. 697. East and south, survey No. 893-2. West, survey No. 698.	·05
Do. No. 703..	Sankuru Bankenna, Sankuru Kondappa, Sankuru Rajamma, Sankuru Lingamma, Sankuru Pokanna and Sankuru Bhogappa.	North, survey No. 703. East, survey No. 698. South and west, survey No. 702.	·05
Do. No. 685..	Do. do. ..	North, survey No. 685. East, survey No. 686. South, survey No. 685. West, survey No. 678.	·17
Do. No. 702..	Chakrapani and Srinivasa Rao Pantulu Garu.	North, survey No. 702. East, survey Nos. 893 and 703. South, survey No. 702. West, survey No. 701-1-2.	·60
Do. No. 683..	Do. ..	North, survey No. 683. East, survey No. 684. South, survey No. 685. West, survey No. 678.	·07
Do. No. 679..	Do. ..	North, survey No. 679. East and south, survey No. 678. West, survey No. 676.	·08
Do. No. 701-1.	Kona Ramudu, Kona Bankenna, Kona Guruvajee and Kona Ganguiya.	North, survey No. 701-1. East, survey No. 702. South, survey No. 701-2. West, survey No. 686.	·14
Do. No. 701-2.	Kona Paramma	North, survey No. 701-1. East, survey No. 702. South, survey No. 701-2. West, survey No. 701-3.	·07
Do. No. 701-3.	Kona Bangi Ramudu ..	North, survey No. 686. East, survey No. 701-2. South, survey No. 701-3. West, survey No. 686.	·04
Jeroyati, tope, survey No. 686.	Ghanta Mallaiya and Ghanta Ramaiya.	North, survey No. 686. East, survey No. 701-1. South, survey No. 686. West, survey No. 685.	·31
Do. No. 675..	Do. ..	North, survey No. 674. East, survey No. 675. South, survey No. 676. West, survey No. 675.	·29
Jeroyati, dry, survey No. 684.	Samudi Pottiga	North, survey No. 684. East and south, survey No. 685. West, survey No. 683.	·01
		Total ..	3·71
		Kommapalli and Nuvapalli, hamlets of Srirampuram Agraharam.	
Inam, waste, R. No. 1.	Vinayaka Panigrahi ..	North, R. No. 2. East, R. No. 1. South, remaining lands. West, R. No. 1.	·10
Do. wet, R. No. 2.	Do. ..	North, R. No. 3. East, R. No. 2. South, R. No. 1. West, R. No. 2.	·15
Do. waste, R. No. 3	Do. ..	North, R. No. 4. East, R. No. 3. South, R. No. 2. West, R. No. 3.	·07
Do. wet, R. No. 4.	Do. ..	North, R. No. 6. East, R. No. 5. South, R. No. 3. West, R. No. 4.	·13

notification—C

13

Notification—C

under Sub-section (2) of Section 3 of the Madras Steam Boilers and Prime-movers act III of 1893, the Government directs that the Inspectors appointed under the said act shall exercise the powers and perform the duties conferred and imposed by or under this act on an Inspector throughout the city of Madras.

Notification—D

under Section 4 of the Madras Steam Boilers and Prime-movers act III of 1893, the Government fixes the 1st August 1897 as the date after which no boiler shall be used unless a license authorising it

its use has been granted
under the act, and is
in force.

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a1

NOTIFICATION E

(a) Under section 9 of the Madras Steam-boilers and Prime-movers Act, 1893, the Government prescribes the following form of register of boilers :—

Name of Owner.	Place where boiler is situated.	Registry number and description of boiler and age.	Nominal horse-power.	When, where and by whom made.	When and where last repaired.	Date of grant of license.	Maximum pressure at which boiler may be worked.	Time for which this license is to be in force.	Remarks.
1	2	3	4	5	6	7	8	9	10

(b) Under the same section the Government directs that the registry number of every boiler shall be cut in the front plate thereof in such position as shall be pointed out by the Inspector. The device to be so cut shall consist of the letters "RY" above the letters "No." and divided from them by a horizontal line; the letters "No." to be followed by the registry number in figures, the letters being at least one-half of an inch, and the figures at least one-and-a quarter inch, in height; the whole to be enclosed in a rectangular figure one-sixteenth of an inch clear from the letters and figures; thus—

RY.
No 148.

The engraving shall be not less than one-sixty-fourth of an inch deep.

a2

NOTIFICATION F

Under section 11 of the Madras Steam-boilers and Prime-movers Act, 1893, the Government authorizes the Sanitary Engineer to revoke and suspend licenses granted in respect of boilers for the reasons therein given.

NOTIFICATION C.

Do.	No. 702..	Chakrapani and [illegible]

a3

1. Under section 12 (4) when the Chief Presidency Magistrate thinks fit to summon assessors to assist him, the appellant shall be permitted to nominate one assessor and the Inspector the other, provided that if either of the assessors or both of them appears or appear to the Chief Presidency Magistrate to be incompetent, he may nominate one or both himself.

2. The opinions of the assessors shall be recorded and duly considered, but the decision of the appeal shall rest with the Chief Presidency Magistrate.

3. Assessors appointed under section 12 (4) and persons summoned to give evidence as "experts" when assessors are not appointed, shall be entitled to a fee of Rs. 15 for each day's attendance in Court.

NOTIFICATION H

Under sub-section (5) of section 12 of the Madras Steam-boilers and Prime-movers Act, 1893, the Government prescribes the following as the form in which licenses shall be granted by the Chief Presidency Magistrate :—

License.

ance of owner	Registry number & description of boiler & age	nominal horse-power	when and where made	when & where last repaired	Time for which this license is to be in force	maximum pressure at which the boiler may be worked	Remarks.

Certificate

15

Certificate. — I, the under-signed, * being assisted by A and B, two competent assessors, * am satisfied that C is entitled to the above license and have granted it to him on this date under the provisions of section 12 (5) of Madras Act III of 1893; and I hereby direct the Inspector to register the boiler specified in the above license and to allot to it a registry number in accordance with section 9 of the said Act.

D. E
Chief Presidency magistrate

* The words between asterisks to be omitted when no assessors are employed.

To All District magistrates
the Commissioner of Police, Madras
" Judicial dept:
" Local & Municipal dept:
" Sanitary Engineer
" Chief Presidency magistrate
" Govt: Solicitor
" Accts-General
" Chamber of Commerce
" Madras Trades Association.
" Gazette.

20/11/97
R/1247

Public Works (1896) Department.

CURRENT No. 11535

Order

W5W

From

The Sanitary Engineer
to Government
and
Inspector of Boilers (Ex: Offici

No. 3491

Dated 17 December 1896

Received 19.12.96

Enclosures Nil

Spare copies

SUBJECT.

Madras Steam Boilers and Prime Movers Act III of 1893

Reporting the date from which the — should be brought into force and the date after which no boiler should be used without a license

BACK PAPERS.

G.O.	No.	Department.	Date.	
Madras Act No. III of 1893.				
memo	4739c	P.W.	9-12-96	✓
"	4706c	"	8-12-96	✓
"	4626c	"	5-12-96	✓
"	4627c	"	5-12-96	✓
G.O.	3490W	"	5-12-96	✓
	2000 + papers no		21-1-97	✓
	the Bank of M.			
	& file in cent			

FURTHER PAPERS.

G.O.	No.	Department.	Date.

S. E. 6. 1,000—22-7-96.

No. 3491

GOVERNMENT OF MADRAS.

OFFICE OF SANITARY ENGINEER,

Fort St. George, 17 Dec 1896.

From

J. A. JONES, Esq. MEM. INST. C.E., F.R.S.E.,

SANITARY ENGINEER TO GOVERNMENT, and

Inspector of Boilers (Ex-Officio).

To

The Secretary to Government,

Public Works Department.

SIR,

With reference to G.O., No. 5490 W, dated 5th. December 1896, I have the honor to report that, presuming the Inspector will join within a month, a notification under Section 1 (2) of the Madras Steam Boilers and Prime Movers Act III of 1895 may be made to the effect that the Act will come into force upon the 1st. February 1897.

2. It will probably take about six months before all the boilers can be examined. I would therefore, under section 4 of the Act, fix the 1st. August 1897 as the date after which no boiler should be used without a license.

I have the honor to be

Sir,

Your most obedient servant,

Sanitary Engineer to Government

and Inspector of Boilers (Ex-Officio)

Public Works (1896) Department.

CURRENT No. 11563

Order

From
The Sanitary Engineer & Ex-Officio
and
Inspector of Boilers (Ex-Officio)

No. 3495

Dated 18th December 1896

Received 19.12.96

Enclosures nil

Spare copies

SUBJECT.

Madras Steam Boilers and Prime Movers act, 1893.

Stating that, under the circumstances stated, it is a question for Government to decide whether the republication of the rules framed under the ——— is not necessary after the Act comes into force.

BACK PAPERS.

G.O.	No.	Department.	Date.
	4739 C		9-12-96
	4706 C		8-12-96
	4626 C.		5-12-96
	4627 C		5-12-96
	3620 W		5-12-96
	+ Papers		

FURTHER PAPERS.

G.O.	No.	Department.	Date.

S. E. 1,000—22-7-96.
6.

No. 3495

GOVERNMENT OF MADRAS.

OFFICE OF SANITARY ENGINEER,

Fort St. George, 18th Decr 1896.

From

J. A. JONES, ESQ. MEM. INST. C.E., F.R.S.E.,

SANITARY ENGINEER TO GOVERNMENT, and

Inspector of Boilers (Ex-Officio).

To

The Secretary to Government,

Public Works Department.

SIR,

I have the honor to inform you that Government in its Notification published in the Fort St.George Gazette dated 5th.February 1895, page 107 of Part I, directed that the Madras Steam Boilers and Prime Movers Act, 1895, shall come into force upon the 1st.April 1895 and by notification published in Fort St.George Gazette of 4th.August 1896 pp 948 of part (I) directed "that the introduction of the Act shall be postponed until further orders". The Government under section 25 of the Act framed rules & published them in the Gazette of 2nd. July 1895, part I pages 742/751 notifying that they "shall come into force from the date of publication thereof in the Fort St.George Gazette". But since then the introduction of the Act was postponed. It is therefore question for Government to decide whether the republication of the rules is not necessary after the Act comes into force; this I have recommended it should do (vide my No. 5491 dated 17th. December 1896) on 1st.February 1897.

I have the honor to be,

Sir,

Your most obedient servant,

Sanitary Engineer to Government
and Inspector of Boilers (Ex-Officio).