**Reg. 375\***

**REGULATIONS FOR THE REGISTRATION OF BOILERS AND INSPECTION OF BOILERS AND STEAM-PIPES**

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| The procedure to be followed in connection with applications for the registration of a boiler and with examinations of boilers under the Act shall be regulated in accordance with the provisions of this Chapter read with the relevant Sections of the Act. |

**REG.376**
**Preparation for Inspection**

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| a) | At every examination of boiler or the grant of renewal of a certificate, the boiler shall be empty and thoroughly clean in all its parts. Except as provided as for in sub-regulation (f) all doors of manholes, handholes and sightholes and cleaning plugs and all caps in the leaders and mud drums of water tube boilers, all firebars, bearers, front plates, bridge plates, fire bridges brick arches, oil fuel burners and mechanical stoker fittings shall be removed. All valves and cocks comprising the boiler mounting shall be opened up and taken apart and the valves or cocks ground, when necessary, before the Inspectors’ visit. |
| b) | Provision shall if, required by the Inspector, be made for the removal of lagging or brick-work or other concealing part and for the drilling of plates, and for verifying the pressure gauge and safety valve dimensions and weights. |
| c) | All smoke tubes, exterior of water tubes, smoke boxes, and external flues shall be swept clean. |
| d) | Provision shall be made for the effective disconnection of all steam and hot water communication with another boiler under steam as required in [Chapter IX-A](http://dipp.nic.in/boiler_rules_updated/chapter9.htm) of these Regulations |
| e) | No blank flange/plug shall be inserted between a safety valve chest and the boiler generally and where it is permitted by the Inspector, the blank flange/plug shall be removed in his presence. |
| f) | At alternative annual inspections and subject to a minimum of three bottom rows or all tubes subject to the first pass of heat being opened up for inspection the Inspector may at his discretion relax the preparation for inspection called for under (a) above in favour of boilers having an evaporative capacity of 200,000 lbs. per hour and over, and fed either water treated to the satisfaction of the Inspectors. |
| g) | In the case of forced flow and forced circulation types of boilers, provisions shall be made for checking that proper circulation is maintained through all sections of the circuit by the flow of water. |
|   | **\* Note:-** In accordance with section 7 and 8 of the Act, Inspectors are required to measure and examine boilers for registration, to examine boilers for renewal certificates, to determine subject to the approval of the Chief Inspector, the pressure at which they may be allowed to work, to grant certificate therefor and generally to convey to the owners such orders as the Chief Inspector may issue.  |

**Reg. 377, Reg. 378**
**Hydraulic test of boilers for registration**

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| Every boiler shall be hydraulically tested in the presence of an Inspector. |

**Reg. 378**
**Preparation for hydraulic tests**

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| a) | The chest of all mountings subject to the steam pressure shall be in place and shut tight or blank flanged. |
| b) | The safety valves should invariably be removed and the chest opening blank flanged. |
| c) | The attachment for the Inspector’s pressure gauge shall be in order. |
| d) | All doors shall be properly jointed and tightened up. The boiler shall be completely filled with water, care being taken to allow all air to escape and, if possible, a preliminary test not exceeding the working pressure of the boiler shall be taken before the Inspector’s visit, to test the tightness of the joints. |
| e) | When a boiler is hydraulically tested for the first time, it shall be entirely cleared of lagging or brickwork; at subsequent tests the lagging or brickwork, or portions thereof, shall be removed if required by the Inspector.Provided that the Inspector may, at his discretion, allow the lagging and brick work to remain in situ, in case of boilers where the covered parts have been fabricated and tested before erection in position.  |

**Reg.379**
**Procedure of hydraulic tests**

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| (i) | Subject to the provisions of sub-regulation (e) of [regulation 381](http://dipp.nic.in/boiler_rules_updated/reg381.htm), every boiler shall be hydraulically tested after erection at site in presence of the Inspector to 1¼ times the maximum working pressure as certified by the Inspecting Authority in Form II, to be stamped on the boiler, as free from any indication of weakness or defects. |
| (ii) | If all components of the boiler in the manufacturer’s premises have not been tested hydraulically as per [regulation 268](http://dipp.nic.in/boiler_rules_updated/reg268.htm), the test, on completion, shall be taken to 1½ times the maximum working pressure. |
| (iii) | The temperature of the water used as medium of pressure testing shall not be less than 20°C and greater than 50°C. |
| (iv) | The test pressure shall be raised gradually under proper control at all times so that it never exceeds by more than 6% of the required pressure and maintained for 30 minutes whereupon the pressure shall be reduced to maximum allowable working pressure and maintained for sufficient time to permit close visual inspection for leakage of pressure parts. |

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| b) | The boiler shall satisfactorily withstand such pressure without appreciable leakage or undue deflection or distortion of its parts for at least ten consecutive minutes. If the test is not satisfactory, the working pressure allowable by calculation shall be suitably reduced, unless the owner desires to make such alterations as will enable the boiler to withstand satisfactorily the hydraulic test, in which case the boiler shall again be examined after the alterations have been made, the pressure recalculated, if necessary, and the boiler tested to the satisfaction of the Inspector. |
| c) | **\*** At the first hydraulic test of a boiler prior to the issue of an original certificate deflection measurements shall be made before, during and after test of each furnace length, fire-box and flat end or other plates. |
| d) | After the application of the hydraulic test the Inspector shall carefully examine the boiler inside and outside and satisfy himself that it has satisfactorily withstood the test. |
| e) | In any case in which the safe working pressure to be allowed for a boiler cannot, owing to peculiar construction of any of its parts, be determined by calculation in the ordinary way, the Inspector shall, under the direction of the Chief Inspector, subject the boiler to hydraulic test for the purpose of determining the fitness of such parts. The amount of the test pressure to be applied in such a case shall not exceed the test pressure prescribed for the least working pressure found by calculation for other parts of the boiler or the intended working pressure whichever is less. |
| f) | Should any part of the boiler show undue deflection or indication of permanent set during the progress of the test, the pressure shall be released immediately such indications are observed. The working pressure for the part shall be 40 per cent of the test pressure applied when the point of permanent set was reached. This procedure shall apply to any boiler at any test. |
| g) | Hydraulic tests of boilers at subsequent examination shall, except when the Inspector expressly requires otherwise, be made after the inspection. The test pressure to be applied to boilers at such subsequent examinations shall be from one and a quarter to one and a half times the working pressure of the boiler. |
| h) | When the internal construction of size of a boiler does not permit of the Inspector getting inside it or of examining closely all its parts, he shall see it tested by hydraulic pressure to one and a half times the working pressure at each inspection or the grant or renewal of a certificate. |
| i) | Water tube locomotive type and all tubular boilers shall be hydraulically tested at each inspection for the grant or renewal of a certificate, unless such test is waived under the order of the Chief Inspector. |
| j) | The Inspector may if the considers it necessary, apply a hydraulic test to any boiler at any inspection. |
| k) | Except in the case of vertical boilers, heating surface of which is less than 18.58 sq.m. (200 sq. ft.), portable and vehicular boilers, which do not require re-erection or building in brickwork, the hydraulic test of all boiler shall be conducted only after the erection of the boiler in situ and all boilers shall after re-erection in a position different from that in which they were last examined be hydraulically tested. |
| **\* NOTE:-**These deflection measurements should be entered in the Memorandum of Inspection Book before its submission to the Chief Inspector.  |
| l) | A hydraulic test shall also be taken before granting an increased pressure certificate and after repairing a boiler. However, in the case of minor repairs to the Water Tube boilers where NDT has been carried out, hydraulic testing may be dispensed with provided NDT is carried out by an approved method. |
| m) | When carrying out hydraulic test, Inspectors shall use pressure gauges supplied by the Chief Inspector. |

**Reg. 380\***
**Steam tests**

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| a) | Every newly registered boiler and every other boiler of which the working pressure has been altered shall, before the issue of an original or renewal certificate for such boiler, be tested under steam to the satisfaction of the Inspector. |
| b) | at the time of test the safety valves shall be left free and capable of being adjusted to the approved working pressure. |
| c) | After adjustment of the valves to the correct blowing pressure the boiler shall be tried under full steam and firing with the feed water shut off and the stop-valve closed, during which time the Inspector shall note the accumulation of pressure and other details of the test as well as the loading and adjustment of the safety valves.In the case of water tube boiler or boilers fitted with super heaters, the feed water connection and stop valve need not be shut off and if the total safety valve are is lifted and found to be adequate by calculations, the requirement of the accumulation test may be assumed to have been satisfied if the valves are or have been found so adjusted that at least one safety valve on each boiler shall lift at or below the designed working pressure of the boiler and all valves shall lift so that all steam which can be generated by the boiler can be discharged with a pressure rise not exceeding 10% of the designed working pressure. |
| d) | Before the safety valve test, the Inspector shall satisfy himself that the water gauges are in working order and that the feed apparatus is capable of supplying the boiler with sufficient water. |
| e) | Where the State Government does not require a person-in-charge of a boiler to hold a certificate of competency, the Inspector may, when he thinks fit, satisfy himself by questioning or by practical test whether the person-in-charge of the boiler understands the use and purpose of the water gauges, the pressure gauge, the safety valves, the feed water-supply and blow down. |
| f) | When witnessing safety valve test, Inspectors shall use the standard pressure gauges supplied by the Chief Inspector unless the boiler pressure gauge has, since the time of inspection, been tested and found correct with an authorized testing machine.**NOTE:-** A steam test is primarily intended for the purpose of ascertaining by actual test whether the safety valves are sufficient to reliever boilers effectively of excess steam and whether they operate at the time when the maximum working pressure is reached. Inspectors should always send to the owner due notice of the date fixed for the steam test. On completion of the test the Inspector should enter all details in the Memorandum of Inspection Books. |
| g) | No steam gauge shall be used without a syphon filled with water between it and the boiler. |
| h) | When the accumulation of the maximum working pressure, the area of the safety valves shall be considered insufficient, and a certificate shall be refused until the safety valve area is increased. |
| i) | An Inspector may, when visiting a factory for any purpose, verify the correctness of the safety valves and pressure gauge of any boiler under steam by comparison with him standard pressure gauge. |

**Reg. 381**
**Procedure for registration**

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| a) | On receipt of an application for registration under Section 7(1) of the Act, the Inspector shall, when the boiler has been properly prepared for examination proceed to measure in complete detail all its parts, ascertain the working pressure allowed by the Regulations by making a series of calculations of the strength of the various parts, such calculations being based on his measurement and if he is satisfied with the correctness of the maker’s certificate, on the dimensions and other particulars relating to the material and construction as stated therein [vide Section 14(1)(c) of the Act and Regulation]. In making his calculations he shall after examination of the material, take due account of the workmanship and details of the construction of each part. In his examination the Inspector may, if he deems necessary bore the plates or other parts to ascertain their thickness and in making his calculations he shall be guided by the requirements of the Regulations. |
| b) | If no formulae or co-efficient applicable to any part is contained in the Regulations, the Chief Inspector shall in his discretion determine the fitness of such part. |
| c) | The strength of the weakest part so calculated or determined, subject to any discretionary power exercised by the Chief Inspector, shall determine the permissible working pressure of the boiler. After inspecting the boiler and ascertaining by the prescribed calculations the maximum pressure at which the boiler may be worked, the Inspector shall hydraulically test and steam-test it in accordance with requirements of [Regulations 379](http://dipp.nic.in/boiler_rules_updated/reg379.htm) and [380](http://dipp.nic.in/boiler_rules_updated/reg380.htm) and a provisional order under Section 9 of the Act in Form V may be issued after the hydraulic test. |
| d) | The Inspector shall enter the above particulars and dimensions of the boiler and calculations of strength of the various parts, together with details of the hydraulic and of the steam tests, in a “Memorandum of Inspection” Book (vide [Regulation 386](http://dipp.nic.in/boiler_rules_updated/reg386.htm)) which, together with all the maker’s papers for the boiler, shall be submitted to the Chief Inspector with the Inspector’s report under sub-section (3) of Section 7 of the Act in Form I. |
| e) | Where a certificate in Form II and a Memorandum of Inspection Book in Form I are furnished by an Inspecting Authority in accordance with sub-regulation (c) of [Regulation 4](http://dipp.nic.in/boiler_rules_updated/reg4.htm), the Inspector shall, on receipt of an application for registration under sub-section (1) of Section 7 of the Act, proceed to make such examination and measurement of boiler as will satisfy him that the boiler is the one certified by the Inspecting Authority and carry out a thorough examination and check the measurements to ensure the correctness of the Inspecting Authority’s certificate and that no damage has been caused in transit.The Inspector shall, if he is satisfied with the condition of the boiler, the correctness of the particulars and approved working pressure entered in Form I by the Inspecting authority, subject the boiler to hydraulic test in accordance with [Regulation 379](http://dipp.nic.in/boiler_rules_updated/reg379.htm).When the Inspector is satisfied that the boiler has satisfactorily withstood the test, he shall issue a provisional order to enable the boilers to the worked. |

**Reg. 383**
**Measurement of heating surface**

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| a) | For the purpose of regulating the area of the safety valves and the amount of registration and inspection fees the “heating surface” of a boiler shall be the total surface of all plates and tubes exposed to heat on one side and in contact with water on the other measured on the water side or the fire side, whichever is larger. |
| b) | For Lancashire and Cornish boilers the total heating surface shall include the wetted surface of the furnaces between the end plates, the fire surface of cross tube where fitted, and the part of the external shell below the side flue covers. In estimating the areas furnaces shall be considered as plain cylinders the area of their wetted surface shall be taken as their mean external circumference x the length of the boiler between end plates. For the shell the width of that part of the circumference below the flue covers shall be taken as = 2 D, and this width + the length between end plates shall be taken as the area of shell heating surface. The part of the surface of the back-end plate exposed to heat shall be omitted from the calculation.Example.- The formula for the total heating surface of a Lancashire boiler having plain furnaces without cross tubes is as follows:-H.S. in square feet = 2L(3.14 d + D). L is the length of the boiler between end plates in feet and D is the internal diameter of the largest belt of shell in feet. |
| c) | For steam and water drums of water tube boilers the heating surface of the drum shall be taken as half the external mean circumference multiplied by the clear length of drum between the outer brick walls or centres of cross boxes, as the case may be. The heating surface of the tubes shall be taken as the external surface of the tubes between the tube plates or heaters. The heating surface of the heaters shall be omitted from the calculation. |
| d) | For marine boilers of the fire-tube type, the heating surface shall include the wetted surface of the furnaces between the tube plates (considered in the same way as for Lancashire boilers), the wetted surface of the combustion chambers (less the area of the tube holes) and the wetted surface of the tubes between tube plates. The parts of the front tube plate exposed to heat shall be omitted from the calculation. |
| e) | For locomotive type boilers, the heating surface shall include the wetted surface of the fire-box above the foundation ring (less the area of the tube holes and the firehole and ring) and the wetted surface of the tubes between the tube plates. The smoke box tube-plate shall be omitted from the calculation. |
| f) | For vertical boilers of ordinary type the heating surface shall include the wetted surface of the fire-box above the foundation ring (less the area of fire hole and ring and tube holes if any) and the surface of any cross or other tubes and uptake below the lowest water level shown in the gauge glass. |
| g) | For Electrode boilers the heating surface shall be calculated as follows:

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| Heating surface = | E |
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where E = the equivalent evaporation at 212°F under normal load, which x  K.W.K.W. the kilowatts absorbed at the stated voltage when the water in the boiler has a specific resistance of not less than 200 ohms per inch tube at 150oF and while the boiler is delivering its normal output of steam at its working pressure with the feed water temperature of 60°F, |
| h) | No deduction shall be made for stays, etc., in calculating the heating surface. |
| i) | For any other heating surface not provided for in the foregoing instructions the same general procedure shall be observed. |

**Reg. 384**
**Boiler rating**

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| The boiler rating shall be the number of square metres (to the nearest whole number) in the heating surface of the boiler as determined under [Regulation 383](http://dipp.nic.in/boiler_rules_updated/reg383.htm). |

**Reg. 386**
**\* Memorandum of Inspection Book**

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| a) | A Memorandum of Inspection Book shall be prepared for each boiler in Form I. In this book the Inspector shall enter in ink all particulars and dimensions of the boilers with the calculations for the various parts in details, particulars of hydraulic test and steam test and his inspection notes. |
| b) | At subsequent inspections Inspectors shall enter the dates of the inspections hydraulic tests and steam tests, when such are made with their notes thereon. |
| c) | Inspectors should also enter in the Memorandum of Inspection Book the general condition of the boiler and of repairs, to what extent boiler have been cleared of brick work, etc., a report of all casual visits for inspection of repairs, for inspection of main-steam-pipes, and reports on accidents, etc., in this way the Memorandum of Inspection Book will provide a useful record of the boiler’s history for the information and guidance of Inspectors at subsequent inspections. |
| d) | On submission of the Memorandum Book to the Chief Inspector he will in the case of newly registered boilers, check all particulars and calculations and approve of the working pressure that is to be permitted. In the case of old boilers, the Chief Inspectors will examine the Inspector’s notes of inspection and proposals made for repairs or reduction of pressure. A pressure once approved for the boiler should not be altered without the written authority of the Chief Inspector. \* The Memorandum of Inspection Book should always be kept clean and up-to date Inspection Books except when actually required by Inspector, should be filled in the office of the Chief Inspector. |

**Reg. 387,**
**Registration Book**

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| a) | A Registration Book or copy of Memorandum of Inspection Book containing all the particulars required for registration shall be maintained in the office of the Chief Inspector in Form I and any order passed by him regarding the boiler shall be entered in the Registration Book under his initials. |
| b) | The Chief Inspector should also see that the note of subsequent inspections entered in the Memorandum of Inspection Book are copied in the Registration Book. |

**Reg. 388, Reg. 389**
**Transfer of Memorandum of Inspection Book and Registration Book**

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| On a boiler passing from one State to another, the Memorandum of Inspection Book and the Registration Book shall, on the request of the Chief Inspector of the State to which the boiler has been transferred, be forwarded to that officer who shall take over their custody and maintain them as herein before prescribed. |

**Reg. 389**
**Grant of certificate**

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| A certificate for the use of a boiler shall be granted in Form VI. In the certificate shall be entered the maximum pressure at which the boiler shall be worked, the load to be placed on the safety valves or the thickness of washers or ferrules required as safeguard against overloading and the date and pressure of the last hydraulic test of the boiler.   The Inspector's remarks should be as brief as possible. |

**Reg. 390
Procedure for inspection of installed boilers**
**General Instruction**

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| a) | It is essential to have every part of the boiler, that is accessible, open and properly prepared for examination, internally and externally. All boilers have openings through which an examination may be made and which for operation are closed; all such parts shall be opened whether for access to water surfaces, or heater surfaces. In cooling a boiler down for inspection or repairs, the water should not be withdrawn until the setting is sufficiently cooled to avoid damage to the boiler and when possible allowed to cool down naturally. It is not necessary, in order to comply with ordinary prudence, to remove insulation material, masonry, or fixed parts of the boiler, unless defects or deterioration peculiar to certain types or inaccessible parts of boilers are suspected and where there is moisture or vapor showing through the covering should be removed at once and a complete investigation made. Particular attention should be paid to the external parts of boilers in the way of seating blocks, especially when the situation is damp. Saddle tanks and engine fittings of locomotive type boilers should be removed to facilitate the inspection of the parts underneath at the first inspection, and at any reasonable period afterwards if the Inspector cannot otherwise satisfy himself as to the condition of those parts. Upon sufficient visible evidence or suspicion due to age or other causes, every effort shall be made to discover the true condition, even to the removal of insulating material, masonry or fixed parts of a boiler. Sometimes drilling or cutting away of parts is justifiable and necessary to positively determine this condition.The Inspector should, whenever the size permits, go inside it and make a thorough inspection of all its internal parts. Before doing so, he should of course, satisfy himself that proper provision has been made for disconnecting the boiler from any other boiler under steam. Should he find that proper provision for disconnection has not been made or that the boiler has not been properly cleaned or scaled, or that is unreasonably hot, he should decline to proceed with the inspection and should report the facts to the Chief Inspector for orders. When a boiler is of such a size or its construction is such that the Inspector cannot go inside it, there should be sufficient sight holes or hand-holes provided to enable him to see the principal internal parts; if any important part of a boiler is so constructed that the Inspector cannot examine it, he should report the facts to the Chief Inspector for orders.In the case of forced circulation and forced flow boilers which are not accessible to close visual inspection, the Inspector should, besides thorough examination, ensure by the flow of water that proper circulation is maintained through all sections of the water circuits. |

**Reg. 391 A**
**Aging of boilers**

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| a) | **Shell Type Boilers:-**

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| (i)  | In order to take the aging effect on boilers, the working pressure of the parts of them as calculated from the formulae in these regulations shall be reduced as per the table given below:-

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| Age of boiler exceeding(in years) | 25 | 35 | 45 | 50 | 60 | 70 | 80 | 90 | 100 |
| Maximum permitted working pressure percent. | 95 | 90 | 85 | 80 | 70 | 60 | 50 | 40 | 30 |

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| (ii) | For those boilers the plates of which have already been cut and tested shall be given a further lease of life of fifty years from the date of the test of the boilers. The working pressure that shall be allowed after the testing shall be reduced as per the table given below:-

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| Period after date of test(in years) | 10 | 20 | 30 | 40 | 50 |
| Maximum working pressure allowed (percentage) | 90 | 80 | 70 | 50 | 30 |

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|  | b) Water Tube Boilers: -

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| (i) | The boilers which are operating at a temperature of 400°C and above including utility or industrial boilers and all boiler parts operating in the creep range of the boiler shall be non-destructively tested as per the table 1 given below after they are in operation for 1,00,000 hours for assessment of the remnant life of the parts; |
| (ii) | The parts of a boiler when it completes a life of twenty five years are to be tested as per table 2 for assessment of the remnant life of such parts. If results are acceptable as per the standards laid down by the Central Boilers Board, a certificate shall be issued by the Chief Inspector of Boilers for extending the life of the boiler for a further period of ten years or such less period as recommended by the Remnant Life Assessment Organisation. This assessment of remnant life shall be carried out thereafter every five years by the organisations working in the field of boilers and remnant life and extension thereof after such organisation is approved by the Central Boilers Board. Such organisation shall work in close coordination with the office of the Chief Inspector of Boilers in the field of remnant life assessment and extension. The working pressure of such boilers may be reduced on the recommendations of such approved organisation. Notwithstanding anything contained in this regulation, for boilers working at a pressure less than 50 kg/cm2, such elaborate remnant life assessment is not mandatory. However, in such cases, drums and headers of such boilers shall be inspected by Ultrasonic testing, Magnetic particle testing and Dye penetrant test. |

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**Reg. 392, Reg. 392 a, Reg.392 b**
**Repairs to boilers and steam pipes**

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| (1) Major repairs such as fusion welded or riveted patches to shells, fire boxes and end plates of boilers and extensive building up of wasted parts of boilers permitted under these regulations, the renewal of furnaces and end plates, parts of shell, fire boxes, girders and steam-pipes, etc. shall only be entrusted to a firm who is recognised as a repairer under these regulations.  (2) Any firm seeking recognition shall apply to Chief Inspector of Boilers of the State in which the recognition is sought.   (3) A firm seeking recognition as a repairer shall meet the following requirements depending upon the class of boilers, namely:-(i)                Class I boiler repairer- The owner of the firm himself shall have a degree in mechanical or electrical engineering or the firm shall have on its rolls a permanently employed engineer having a degree in mechanical or electrical engineering with the firm having at least five years' experience in fabrication, erection, repair or maintenance and quality control of boilers, and qualified and permanently employed welders as per the provisions of these regulations;(ii)               Class II boiler repairer- The owner of the firm himself shall have a diploma in mechanical or electrical engineering or the firm shall have on its rolls a permanently employed engineer having a diploma in mechanical or electrical engineering with the firm having at least three years' experience in fabrication, repair and maintenance of boilers;(iii)             Class III boiler repairer - The firm shall have the experience of five years in repair, maintenance, operation, erection or inspection of boiler.(iv)             (a) Where the power stations, fertilizer plants, chemical and petrochemical plants or refineries apply for repair of their own boilers, they shall have all the facilities in-house and may apply to the Chief Inspector of Boilers of the State for permission to repair their own boilers in accordance with these regulations. (b) On receipt of the application for permission to repair to a boiler, the Chief Inspector of Boilers of the State shall reply to the request within a period of fifteen days of the receipt of the application.(4) On receipt of the application under sub-regulation (3), the Chief Inspector shall send a questionnaire in ‘Form XVIII’ to the applicant.(5) The Chief Inspector will scrutinize and evaluate the application along with the replies to the questionnaire and after satisfying himself that the following requirements are fulfilled, shall recognise the firm as a repairer in the category applied for, namely:-(i)                that the firm possesses rectifier or generator, grinder, general tools and tackles, dye-penetrant kit, expander and measuring instruments; (ii)               that the electric arc or oxy-acetylene welding sets and all other tools and plant in his possession for carrying out repairs are suitable for the work undertaken;(iii)              that the quality of material used conforms to the specifications prescribed in these regulations;(iv)              that the supervisory and operational staff employed by the firm possesses the necessary training and experience for the work undertaken;(v)               that all welders employed by the firm possess certificates issued as required under Chapter XIII of these regulations;(vi)              standard of work should be of high order and comply with all the requirements and test that may be prescribed by the Chief Inspector.(6) The recognition of the firm as a repairer shall be for a period of two years. Thereafter they shall apply for renewal of their recognition at least two months before the expiry of said period.(7) In case the repairer is found indulging in violating the provisions of the Act/Regulations knowingly or unknowingly, the firm shall be blacklisted under intimation to Chief Inspector or Director of Boilers of all the States/Union territories and renewal shall not be done in any case. |

**(a) Procedure for repairs**

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| (1) The repair work shall be carried out under the supervision of Inspector, and when the fireboxes and smoke tubes of locomotive tube boilers are withdrawn, the internal parts, which are otherwise inaccessible to close inspection, shall be inspected by the Inspector.  (2) Repair to boiler shells shall be carried out by patching or by removing a strip of worn or damaged plate and inserting the new strip with covering straps over the longitudinal butt ends, the strength of the riveted joints to be not less than that of the longitudinal joints of the shell.  (3) (a) Patches for fire exposed plates shall be fitted metal to metal without joint of any description. (b) The affected part shall be cut out, leaving the corners of the hole well-rounded. (c) Patches shall be secured, wherever possible, properly spaced rivets with a width of plate at least equal to the diameter of rivet between the edge of the rivet hole and the edge of the plate. (d) Where riveting is impracticable, the plate shall be secured by welt fitting countersunk headed screw pins.  (4) The thickness of a patch plate shall not be less than the original thickness of the plate which it is used to patch.                (5) Bulged or distorted furnaces or circular section may, if the bulge or distortion is not too great, be pressed back to shape.   (6) Circular furnaces of horizontal boilers that have become distorted may be suitably reinforced.  (7) (a) Anti-collapse rings shall be of substantial section either of single or double angles bolted back to back with screw stays not less than 22mm in diameter and about 178mm in pitch passed through flat of angle and screwed into the furnace, the ends being either rounded or riveted over on the fire side and fitted with nuts at the other. (b) The stay bolts shall be fitted with ferrules not less than 1 inch in depth between furnace and angle ring.  (8) Welding shall not be accepted for the repair of any part of a boiler for which welding is forbidden for a new boiler under these regulations and boiler shells shall not be repaired by welding beyond the filling up of a small isolated corroded or pitted part or the making up of wasted edges of openings.  (9) Cracks or grooving in dished or flat end plates of cylindrical shells or in the bends of furnace flanges in a circumferential direction may be weed out and welded.  (10) Wasted parts of circular furnaces and fire-boxes and fire exposed flat plates as in rectangular fire-boxes and combustion chambers may be cut out and be replaced by new pieces welded in or they may be built up by welding.   (11) Longitudinal cracks in circular furnaces and fireboxes and cracks in rectangular fireboxes and combustion chambers may be welded.  (12) No stay bar shall be welded.  (13) Smoke tubes may be butt welded either by fusion welding, flush welding or oxy-acetylene welding, and these may be tested hydraulically at the discretion of the Chief Inspector.  |

**(b) Welding**

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| The Repairer shall satisfy the Chief Inspector,-

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| (i) | that the electric arc or oxy-acetylene welding sets and all other tools and plant in his possession for carrying out repairs are suitable for the work undertaken. |
| (ii) | that the quality of material used conforms to the specifications that are prescribed. |
| (iii) | that the supervisory and operational staff employed by him possess the necessary training and experience for the work undertaken. |
| (iv) | that all welders employed by him possess certificates issued as required under [Chapter XIII](http://dipp.nic.in/boiler_rules_updated/chapter13.htm) of these Regulations. |
| (v) | Standard of work should be of high order and comply with all the requirements and test that may be prescribed by the Chief Inspector. |

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**Reg. 393**

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| Submission of manufacturing drawings and the particulars of boilers in advance:-

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| (a) | In the case of land boilers made in India for use in the States, the manufacturing drawings and the particulars of materials, design and construction of boilers shall be submitted by the Makers of the boilers to the Inspecting Authority of the State, where the principal parts of the boilers will be manufactured, for examination and approval before commencement of the manufacture of boilers.  |
| b) | In the case of boilers made outside India for use in the State, the manufacturing drawings and particulars of the material, design and construction, of boilers shall be submitted initially to the Inspecting Authority in the country of manufacture for examination and approval.The manufacturing drawings and the particulars of materials, design and construction in the case of fired boilers of steam generating capacity 100 tons/hour and above and that of Waste heat boiler of 20 tons/hour and above shall then be submitted to the Technical Adviser (Boilers) for selection of latest materials with high strengths and use in high temperature and pressure, energy conservation and increased thermal efficiency and remote control and instrumentation for the safety of the boilers. Thereafter, the manufacturing drawings and the particulars of materials, design and construction shall be sent to the Chief Inspector of Boilers of the State where the boiler will be installed and used, for final examination and approval before commencement of manufacture so as to avoid questions arising at the time of erection and registration of the boiler. |
| c) | The Inspecting Authority or the Chief inspector or both, as the case may be, shall, after examination of the manufacturing drawings and the particulars intimate to the proposer whether they are satisfied with the materials, design, construction and fitness of the parts for the intended pressure and, if not, what modification is necessary therein. When the manufacturing drawings and the particulars of boilers have been approved, the Inspector in making his examination shall see that the design and the particulars of construction as approved have been carefully followed and that the material corresponds with the approved particulars. |
| (d) | The fee for the scrutiny of the manufacturing drawings and the particulars of the materials, design and construction of boilers under sub-regulations (a) or (b) shall be on the scale prescribed in [regulation 385](http://dipp.nic.in/boiler_rules_updated/reg384.htm#reg385) subject to a maximum of Rs.20,000/. When the manufacturing drawings have been scrutinised and in respect of them alterations have been suggested and the same are resubmitted for scrutiny, separate fee at the rate of 10% of the fee for the first scrutiny of the drawings shall be payable if the manufacturing drawings contain alterations other than those previously suggested. |
|   (e) |  The arrangement drawings showing the broad details of modifications or conversions of the existing boiler shall be subject to the approval of the Chief Inspector of Boilers of the State where the boiler is intended for modification or conversion is registered. |
|   (f) | If the detailed manufacturing drawings are got approved by the Inspecting Authority of the State where parts will be manufactured and inspected, no separate compliance of sub-regulation (e) is required. |

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**Reg. 394**

**STEAM PIPES**

 **Inspections of Steam Pipes**

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| a) | Steam pipes shall be inspected and hydraulically tested before erection in place, the test pressure to be that prescribed in the standard conditions for steam pipes. A certificate from the Inspecting Authority in [Form III-A](http://www.dipp.nic.in/boiler/ibr_forms.htm), stating that this has been done by him may be accepted. If the Inspector is satisfied with the test, the pipes may be erected in position. The Chief Inspector shall intimate his approval to the owner regarding the suitability of the pipe line for use at the pressure and temperature to be specified. |
| b) | At subsequent inspections of the boiler or at any other time, the Inspector may make an external inspection of the steam-pipes and for this purpose may require a part of the lagging at the flanges to be removed, and the pipe made bare. If as a result of this inspection the Inspector is of opinion that the pipes or any portions of them are in an unsatisfactory condition, he shall report the matter to the Chief Inspector, who may require the whole of the lagging to be removed and may require any pipe or pipes to be hydraulically tested. The test pressure at such hydraulic test shall be not less than one and a half times the working pressure of the boiler or the intended working pressure of the pipe, as the case may be. |
| c) | A memorandum of Inspection Book shall be prepared in respect of steam-pipes and fittings in [Form No. XIV](http://www.dipp.nic.in/boiler/ibr_forms.htm). In this book, the Inspector shall enter in ink all particulars and dimensions of the steam pipes and fittings with calculations for the various parts in detail, particulars of hydraulic test and his inspection notes.At subsequent inspection, the Inspector shall enter the date of the inspection and hydraulic test together with notes thereon.The Inspector shall also enter in the Memorandum of Inspection Book remarks regarding the general condition of the steam-pipes and fittings, and repairs, replacements or alterations, if any, and the extent to which the steam-pipes have been cleaned of lagging and covering, so that the book provides a useful record of the steam-pipes and fittings for the information and guidance of Inspectors at subsequent inspection.In the event of an accident to a pipe line or its fittings, necessary remarks shall also be entered in the book.The Memorandum Book shall be submitted to the Chief Inspector, who will check all particulars and calculations and approve the working pressure and temperatures that are to be permitted for the various parts of the pipe line and fittings. The pressure and temperature once approved for the particular steam pipe line shall not be altered except on a written authority from the Chief Inspector. |

**Reg. 395, Reg. 395 A

Submission of plans of steam-pipes**

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| a) | Plans of steam pipes shall be submitted with the prescribed fee to the Chief Inspector before construction or at the time of registration of the boiler for his decision whether the pipes and their arrangement comply with the Regulations. |
| b) |

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| (i) | The fees for examination of plans and the particulars of materials, design and construction of steam pipes before the commencement of manufacture of the steam pipes shall be at the rate of Rs. 30/- for 30 meters of piping or part thereof, subject to a minimum of Rs.50/-, inclusive of all fittings excepting the fittings like de-superheaters, steam receivers, feed heaters and separately fired superheaters. For any fittings like de-superheaters, steam receivers, separators and flanges, the fee shall be Rs.150.00 for each category of such identical fittings. |
| ii) | The fees for examination of lay out plans of steam pipes shall be Rs.20/- per 30 metres of piping or part thereof, subject to a minimum of Rs.50/-, inclusive of all fittings, except fittings like de-superheaters steam receivers, feed heaters and separately fired superheaters. For any fittings like de-superheaters, steam receivers and separators, the fee shall be Rs.150.00 for each such fittings. |

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**Reg. 395 A

Inspection fee for boilers and parts thereof constructed in India**

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| 1) | The inspection fee for boilers shall be calculated on the following basis:

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| (i) | at four times the registration fee for a boiler of riveted construction. |
| ii) | at four times the registration fee for a boiler of welded construction. |

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| 2) | Fees for inspections of boiler scantlings shall be charged as under:-

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| (i) | upto 10 square feet (0.929 sq. meter) of outside surface - nil. |
| ii) | above 10 square feet (0.929 sq. meter) of outside surface – one half of the registration fee of the boiler for which the part is intended. |

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| 3) | For inspection of tubes and pipes, the fees shall be charged at the rate of Rs.150/- per metric tonne or a fraction thereof. |
| 4) | Fees for inspection of boiler at the site of construction shall be charged at the rate of four times the registration fee.”. |
| 5) | For inspection of forged pipe fittings, the fees shall be charged at the rate specified for forged and cast flanges under clause (1), of sub-regulation (2) of [regulation 395 C](http://dipp.nic.in/boiler_rules_updated/reg395b.htm#reg395c). |
| 6) | For inspection of pipe fittings other than forged pipe fittings, the fees shall be charged as under:-

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| (a) Upto and including 50mm, for 100 kg. or a fraction thereof | Rs. 50/- |
| (b) Over 50 mm and upto and including 100 mm for 450 kg. or fraction thereof. | Rs. 250/- |
| c) Over 100 mm for 900 kg. or a fraction thereof.  | Rs. 500/- |

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**Reg. 395 B, Reg. 395 C

Fees for inspection of Pipes**

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| a) | For the pipes of nominal bore not exceeding 100 mm inclusive of all fittings, excepting fittings like de-superheaters, steam receivers, feed heaters and separately fired superheaters Rs.200/- for 30 meters of pipe or part thereof. |
| b) | For pipes of nominal bore exceeding 100 mm inclusive of all fittings excepting fittings like de-superheaters, steam receivers, feed heaters and separately fired superheaters Rs.500/-for 30 meters of pipe or part thereof. |
| c) | Fee for inspection of fittings like  feed water heater, desuperheater, steam receivers, separators and separately fired superheaters-Rs.500/-for each such fittings. |

**Reg. 395 g

Fee for inspection of spares and scantlings**

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| (i) | Spares – For all types of coils, namely, economiser coils, superheater coils, reheater coils, the fee for inspection shall be charged on the basis of surface area as provided in [Regulation 385](http://dipp.nic.in/boiler_rules_updated/reg384.htm). |
| (ii) | Scantlings – The fee for inspection of scantlings shall be charged as under:-

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| (a) | for outside surface area not exceeding 1 sq. metre | Rs.500/- |
| (b) | for outside surface area exceeding 1 sq. metre but not exceeding 3 sq. metres | Rs.600/- |
| (c) | for OSA exceeding 3 sq. metres but not exceeding 5 sq. metres | Rs.700/- |
| (d) | for OSA exceeding 5 sq. metres but not exceeding 7 sq. metres | Rs.800/- |
| (e) | for OSA exceeding 7 sq. metres but not exceeding 9 sq. metres | Rs.900/- |
| (f) | for OSA exceeding 9 sq. metres but not exceeding 11 sq. metres | Rs.1000/- |

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| For outside surface area exceeding 11 sq. metres a fee of Rs.50/- shall be charged for every 2 sq. metres or part thereof subject to a maximum of Rs.5000/-  |