## CHAPTER I

## GENERAL REQUIREMENTS, APPLICATION OF STANDARD CONDITIONS AND EXCEPTIONS THERETO

3. (1) A boiler shall not be registered under sub-section (4) of Section 7 of the Act and a certificate shall not be issued under sub-section (5) of that section with reference to a boiler, unless the standard conditions in respect of material, design and construction, which are specified in the subsequent Chapters of these Regulations, are satisfied in respect of such a boiler.

(2) Notwithstanding anything contained in sub-regulation (1), the Chief Inspector may, subject to the provisions of regulations 7 and 8, register a boiler and order the issue of a certificate authorising the use thereof, under any of the following circumstances, namely—

(*i*) when the material used in the construction of a boiler, steam-pipe, economiser or superheater is not in conformity with the Indian Boiler Regulations but is known to be commonly used in other countries as being suitable for use in the construction of boilers and steam-pipes, provided that such material is not specifically prohibited by the Regulations;

(*ii*) when the constructional features of a boiler, steam-pipe, economiser or superheater are not in conformity with the Regulations but are not considered by the Board to be inferior in strength to those prescribed in the Regulations and form part of the usual manufacturing practice of boilers and steam-pipes in other countries;

(*iii*) when a boiler, steam-pipe, economiser or superheater has obviously been built in conformity with the regulations but no certificate as required under the regulations is forthcoming.

(3) No structural part of a boiler, which is subject to pressure, shall be made of Bessemer process steel or of Cast or Malleable Cast Iron.

## STANDARD REQUIREMENTS

4. (*a*) **Material.**—All plates, rivets and bars used in the construction of boilers shall be tested and found to conform with the Regulations hereinafter contained.

* (*b*) **Construction.**—(*i*) All boilers during construction shall be under the supervision of an Inspecting Officer, and shall be inspected at all stages of construction as prescribed in Appendix 'J'.

(*ii*) Welders engaged in site welding of boilers, steam-pipes, economisers and superheaters shall possess and produce to the satisfaction of the Chief Inspector the Welders Performance Qualification Certificate issued by a Competent Authority.

(*c*) **Certificates, etc. under section 14 (1) (c) of the Act.**—In advance of or along with an application for registration of a boiler the following certificates and drawings or specifications shall be furnished to the Chief Inspector namely:—

(*i*) *A certificate in form II.*—From an Inspecting Authority certifying that the material was tested and the boiler was built under their supervision. Together with such certificate the Inspecting Authority may furnish a Memorandum of Inspection Book in Form I prepared in the manner prescribed by Regulation 386 in respect of the Inspection of the boiler during construction and the hydraulic test applied on completion. In case of a boiler which is to be assembled only at site, requirement of the hydraulic test on a completely assembled boiler by the Inspecting Authority shall not apply provided that the individual parts of such boiler have been hydraulically tested and certified by the Inspecting Authority separately as required under these Regulations.

(*ii*) *A certificate in form III* of manufacture and test signed by the maker or by a responsible representative of the maker of the boiler containing a description of the boiler, its principal dimensions, particulars of the kind of material used in its construction, the thickness of all plates, the diameter of and method of forming the rivet holes in the shell plates, particulars of any departure from ordinary practice in making the shell such as solid rolling or welding, the hydraulic test to which the boiler was subjected, the intended working pressure, the area of heating surface, the maximum continuous evaporative capacity, the year and place of make, and the works number of the boiler.

NOTE.—The Chief Inspector may, however, approve a modified form of certificate wherein items which do not pertain to a particular boiler may be omitted.

(*iii*) *A drawing or print* to a scale, in the case of large boilers of not less than $\frac{3}{4}$ inch to the foot and, in the case of small boilers of not less than $1\frac{1}{2}$ inches to the foot, showing the principal dimensions and a longitudinal section and end view of the boiler, and bearing the works number of the boiler and the Maker's office stamp. The drawing shall show details of riveting of longitudinal and circumferential seams with pitch of rivets, cross spacing of rivet rows and diameters of rivet holes, the radii of curvature of dished end plates, fillets and flanges and corners of bent plates, and where gusset stays are fitted the number and diameter of rivet holes in each gusset stay.

In the case of water tube boilers, the foregoing scales shall apply to the main boiler drums only, but in addition a general arrangement drawing of the boiler to a scale of not less than $\frac{1}{4}$ inch to the foot shall be provided.

* (*iv*) *A certificate in form IV* from the steel maker and a certificate from the maker of the plates, rivets or bars, of the nature referred to in Regulations 26 and 27 respectively. The certificate from the maker of the plates, rivets or bars, shall show the charge numbers, the plate or bar numbers and the number and dimensions of the various plates etc. tested, their chemical analysis, their ultimate tensile breaking strength in tons per square inch of section, the percentage of elongation and the length on which measured, the number, kind and result of bend or other tests made and the date of tests:

Provided that where an Inspecting Authority furnished a certificate in Form II together with a Memorandum of Inspection Book



in Form I in accordance with sub-regulation (*c*) (*i*) the certificates prescribed under clauses (*ii*) and (*iv*) need not be furnished to the Chief Inspector when application is made for registration of the boiler. But should any question arise in respect of the fitness of the boilers for the working pressure approved by the Inspecting Authority within a period of three years from the date of their registration, the owner shall if requested by the Chief Inspector obtain and furnish the original documents specified in the said clauses.

In the case of steel made and tested by Well-Known Makers in India or other countries, listed in Appendix 'G', the certificate of the makers in Form IV as prescribed in Regulation 26 may be accepted in lieu of a certificate from an Inspecting Authority in so far as it relates to testing of steel as specified in Form II.

In case where the original certificate from Well-Known Steel-Makers in form IV is not produceable, owing to such certificate containing details of plates used for other purposes also, an extract from the original certificate duly signed by the makers of the boiler and countersigned by the Inspecting Authority shall be acceptable in lieu of the certificate in form IV, provided all information required in form IV are furnished in the extract.

* (*v*) In the case of fusion welded and seamless forged drums and headers a certificate from the manufacturer furnishing the results of tests specified in Chapter V in regard to chemical analysis, tensile, bend and Izod impact tests.

In the case of fusion welded drums the diagram of welded repairs and temperature charts of heat-treatment shall also be furnished.

In addition, certificates in respect of yield point at service temperature (0.2 per cent proof stress), the average stress to produce an elongation of 1 per cent (creep) in 100,000 hours and the average and the lowest stresses to produce rupture in 100,000 hours in the material, wherever is applicable, are to be furnished.

(*vi*) For tubes and pipes subjected to internal pressure, a certificate giving results of tests regarding chemical analysis, warm yield point (0.2 per cent proof stress), the average stress to produce an elongation of 1 per cent (creep) in 100,000 hours and the average and the lowest stresses to produce rupture in 100,000 hours in the material wherever applicable, shall be furnished.

(*d*) **Maker's Stamp.**—The boiler shall have stamped upon its front plate in a conspicuous position the following particulars:—

MAKER'S NAME

Work's Number .....Year of make.....

Tested to.....Lbs.....on.....

W. P. .....Lbs.....

Inspecting Officer's or
Inspecting Authority's Official
Stamp.

* (*e*) **Certificates for steam-pipes.**—A certificate of manufacture and test in Form III-A signed by the maker or a responsible representative of the maker of the steam-pipes containing particulars and results of tests of the materials used in the manufacture and the make tolerance within which they have been manufactured and the hydraulic test of all steam pipes supplied.

And, in addition, information containing results of test for the material regarding warm yield point (0.2 per cent proof stress), the average stress to produce an elongation of 1 per cent (creep) in 100,000 hours and the average and the lowest stresses, to produce rupture in 100,000 hours wherever applicable are to be furnished.

**5. Modification of Formulae.**—(*i*) Under the Regulations for determining the working pressure to be allowed on various parts of boilers, the material to which the formulæ apply shall in the absence of express provision to the contrary be steel complying with the requirements of Chapter II.

(*ii*) Where no test certificates for plates and rivets are produced, the material may be treated as iron, if the Chief Inspector is satisfied that the material is of suitable boiler quality. If in such cases the Chief Inspector is clearly satisfied that the material is of good quality, a higher strength than that allowed for iron may be permitted but the strength of the plates shall not, save for special reasons, be assumed to be more than 26 tons per square inch. In such cases the values of tensile and shear strength shall not be more than 26 and 21 tons per square inch for steel, and 21 and 18 tons per square inch for iron. For iron across the grain the tensile strength may be 18 tons per square inch.

(*iii*) For flat plates of copper, the working pressure as found from the formulæ, reduced by 50 per cent shall be the working pressure permitted.

* (*iv*) When the quality of material and the make of steel pipe have not been supported by certificates from the manufacturers, the pipes shall be treated as rolled lap welded steel pipes and the maximum permissible working stress will be reduced by 25 per cent and they shall be presented for a hydraulic test before erection *in situ*.

**6. Standard specifications for materials.**—The standard specifications for steel wrought iron and copper plates and bars, and for cast steel shall be those prescribed in Chapter II.

**7. Boilers not in accordance with standard conditions.**—When the standard conditions are not complied with, the working pressure of the parts of the boiler as found from the formulæ in the Regulations shall be reduced as follows:—

(*a*) When the certificate in Form II from the Inspecting Authority is not furnished—10 per cent.

(*b*) When there are no proofs of tests of steel—15 per cent.

(*c*) When the workmanship is in any way doubtful, and the Inspector is not satisfied that any of the foregoing reduction in the working pressure would be sufficient to meet the circumstances, such percentage as the Chief Inspector deems fit.

**8. Welding.**—(*a*) The use of welding in the construction of boilers shall be permitted only where specifically provided for in the standard conditions.



(*b*) Notwithstanding anything contained in Regulation 7 hollow forged or fusion welded drums and shells shall be constructed under the supervision of an Inspecting Authority and shall not be accepted unless the certificates required under Regulation 4 are submitted.

NOTE.—For the purposes of this Regulation, certificates issued by an authority empowered in this behalf by or under the law in force in a foreign country in respect of boilers manufactured in that country and containing the particulars required to be specified in the certificates referred to in Regulation 4 may be accepted.