

## **BOILER AND PRESSURE VESSEL REGULATIONS, 2017**

In exercise of the powers conferred by Section 49 and Section 57 of the Factories Act CAP F1, LFN 2004, the Honourable Minister of Labour & Employment, hereby makes the following regulations as modification and extension of the provisions of Sections 31, 32, 33, 34 and 51 of the Act.

These regulations make adequate provisions regarding the safety of persons coming in contact with or involved with the construction, fabrication, installation, use or maintenance of steam boilers ,steam receivers, other pressure vessels, refrigeration plants in any workplace or other premises as stipulated in Section 56 of the Act.

### **Regulation 1 - Citation and commencement**

This Regulation may be cited as the Boiler and Pressure Vessel Regulations, 2017 and shall come into force on 1st January 2017.

### **Regulation 2 - Interpretation**

1. In this Regulation,

“alteration” means any change in the item described on the original manufacturer’s data report that requires a change of design calculations or otherwise affects the pressure-containing capability of a boiler or pressure vessel;

“boiler” means a fired vessel in which gas or vapour may be generated or a gas, vapour or liquid may be put under pressure by heating;

“certificate of inspection” means a certificate issued under this Regulation in respect of an inspection of a boiler or pressure vessel;

“code adopted ” means the “Boilers and Pressure Vessels Code Adopted in this Regulation;

“design”, in reference to a boiler, pressure vessel or piping, means its plan or pattern and includes, where required, drawings, specifications, calculations and test data, or a model;

“fired vessel” means a vessel that is directly heated by,

- (a) a flame or the hot gases of combustion,
- (b) electricity, or
- (c) any means other than a thermal liquid;

“fitting” means an appurtenance that is attached to or used in connection with a boiler, a pressure vessel or piping and includes such things as valves, gauges and controlling devices and other pressure-retaining components;

“low pressure boiler” means,

- (a) a boiler that is intended to generate steam or other vapour at a pressure of 15 psi (103 kPa) or less, or
- (b) a boiler that is intended to be operated at a pressure of 160 psi (1,100 kPa) or less where the water temperature at any boiler outlet is 250°F (121°C) or less;

“maximum allowable working pressure” means the maximum pressure at which a boiler, pressure vessel, fitting or piping is permitted to be operated or used under this Regulation;

“owner” includes a person for the time being in possession or control of a boiler, pressure vessel, fitting or piping;

“piping” means a system of pipes that is used to contain a gas, vapour or liquid under pressure and includes any boiler, pressure vessel or fitting connected to such system;

“pressure” means pressure above prevailing atmospheric pressure;

“pressure vessel” means any enclosed unfired vessel that contains gas, vapour or liquid under pressure;

“professional engineer” means a person who is registered as an engineer by Council for Regulation of Engineering in Nigeria (COREN);

“repair” means any work necessary to restore a boiler or pressure vessel to a safe and satisfactory operating condition that does not result in a deviation from the original design;

“used boiler, pressure vessel, fitting or piping” means a boiler, pressure vessel, fitting or piping that has been in service and that has been moved from its previous site for use elsewhere.

- (2) In the event of a conflict between a provision of this Regulation and the code(s) adopted, this Regulation prevails.
- (3) A reference in this Regulation to a director is a reference to the Director of Factories.

### **Regulation 3 – Application**

(1) This Regulation applies to the design, construction, maintenance, use, operation, repair and service of boilers, pressure vessels, and pressure piping.

(2) This Regulation does not apply to,

- (a) a boiler that is used in connection with a hot liquid heating system that has no valves or other obstructions to free circulation between the boiler and an expansion tank that is vented freely to the atmosphere;

- (b) a low pressure boiler that has either a wetted heating surface of 30 square feet (2.79 square metres) or less, or a power rating of 30 kW or less;
- (c) a boiler having a heating surface of 10 square feet (0.93 square metres) or less;
- (d) a pressure vessel, fitting or piping that contains a gas, vapour or liquid at a maximum allowable working pressure of 15 psi (103 kPa) or less;
- (e) a pressure vessel, fitting or piping that contains liquids not more hazardous than water and that operate at a temperature of 150°F (65°C) or less and at a maximum allowable working pressure of 250 psi (1,717 kPa) or less;
- (f) a pressure vessel for domestic use that has an internal diameter of 24 inches (610 mm) or less for the storage of hot water where the temperature does not exceed 212°F (100°C) and the heat input is 120 kW or less;
- (g) a pressure vessel that is used exclusively for hydraulic purposes at a temperature no greater than 150°F (65°C);
- (h) a pressure vessel that has an internal diameter of 24 inches (610 mm) or less that is connected in a liquid pumping system at a temperature that does not exceed 150°F (65°C) and that contains air or an inert gas compressed to serve as a cushion;
- (i) a refrigeration piping that has a capacity of three tons (11 kW) or less of refrigeration;
- (j) pressure piping that forms part of the heating system in a building that is,
  - (i) heated by steam at a pressure not exceeding 15 psi (103kPa), or
  - (ii) heated by water at a pressure not exceeding 160 psi (1,100 kPa) and at a temperature that does not exceed 250°F (121°C);
- (k) compressed air piping, up to and including ¾ inch nominal pipe size;
- (l) hot oil piping, where the pressure is not greater than 100 psi (687 kPa) and the operating temperature is not less than 50°F (10°C) lower than the flash point of the oil;
- (m) pressure containers that form an integral part of or that are a component of rotating or reciprocating mechanical devices, including pumps, compressors, turbines, generators, engines and hydraulic or pneumatic cylinders where the primary design considerations or stresses, or both, are derived from the functional requirements of the device;
- (n) automatic fire protection systems that are designed and installed in accordance with the Nigerian Building Code;
- (o) buried water piping that operates at a temperature of 150°F (65°C) or less at a maximum allowable working pressure of 600 psi (4,120 kpa).
- (p) a pressure vessel having a capacity of 1 and one-half (1½) cubic feet (42.5L) or less, that is not a fitting;

- (q) a pressure vessel having an internal diameter of six (6) inches (152mm) or less.

#### **Regulation 4 – Adoption of Codes and Standards**

- (1) Subject to the provisions of the Factories Act and these regulations, the Director of Factories may approve, in writing, and appropriately circulate specific codes and standards, for the purposes of this Regulation as a standard governing the design, construction, shop inspection, installation, repair or alteration of boilers, pressure vessels, pressure or piping systems.

#### **Regulation 5 - Requirements for compliance**

- (1) Compliance with adopted codes and standards:

- (a) Every employer, occupier, manufacturer or owner involved with boiler, pressure vessel or piping shall:

(i) ensure complies with the requires of the codes and standards adopted in Regulation 4;

(ii) ensure that the boiler, pressure vessel or plant is maintained in safe working condition and operated safely;

(iii) ensure that every person engaged in an activity involving, use of equipment, process or procedure including, but is not limited to, design, manufacture, installation, repair, alteration, maintenance, service, use or disposal of boiler, pressure vessel or piping to which these Regulations apply shall comply with the Factories Act and this Regulation.

(iv) ensure that no person who designs, constructs, carries out shop inspection, installs, repairs or alters a boiler, pressure vessel or pressure piping system governed by this Regulation shall fail to carry out that activity in accordance with any applicable adopted code or standard.

- (2) Quality control program:

- (a) Subject to Regulation 8, employer, occupier, manufacturer or owner who intends to construct, install, alter or repair a boiler, pressure vessel, fitting or pressure piping system shall:

(i) develop and implement a written quality control program manual that is appropriate for the scope of the work to be carried out and meets the requirements of relevant adopted codes or standards;

(ii) not commence the construction, installation, alteration or repair unless the quality control program manual is reviewed and approved by an Authorized Inspector pursuant to Regulation 10; and

(iii) carry out the construction, installation, alteration or repair in accordance with the registered quality control program manual.

- (3) Welding procedures:

(a) An employer, occupier, manufacturer or owner who intends to construct, alter or repair any boiler, pressure vessel, fitting or pressure piping system by welding shall:

- (i) subject to Regulation 4, develop, and qualify by testing, welding procedures in accordance with Section IX of the ASME code;
- (ii) not commence the construction, alteration or repair unless the welding procedures have been reviewed and approved by an Authorized Inspector pursuant to Regulation 10; and
- (iii) carry out the welded construction, alteration or repair in accordance with the registered welding procedures.

(4) Requirements for boilers:

(A) Each boiler shall be equipped with:

(i) an alarm system that, if an abnormal condition occurs while the boiler is in operation:

- (a) will audibly and visually warn the power engineer in charge or any other person who is in the vicinity of the boiler;
- (b) will initiate an alarm signal to a monitoring system that is continuously attended or electronically monitored; and
- (c) cannot be shut off until the abnormal condition is rectified or the boiler is shut down;

(ii) an automatic control system that will safely operate the boiler while the power engineer in charge leaves the controls; and

(iii) any other devices that the Director of Factories may specify.

(B) Each steam boiler shall be equipped with:

(i) a high pressure tripping device that will:

- (a) automatically stop and prevent the supply of fuel to the boiler if the boiler pressure reaches the maximum allowable working pressure or exceeds an established high pressure limit specified by the manufacturer, whichever is the lower pressure; and
- (b) prevent the boiler from automatically restarting;

(ii) a low water level tripping device, separate from any other device that controls the water level in the boiler during normal operation under automatic control, that will:

- (a) automatically stop and prevent the supply of fuel to the boiler if the water in the boiler falls below a safe operating level specified by the manufacturer; and

- (b) prevent the boiler from automatically restarting;
- (iii) a high water level tripping device, separate from any other device that controls the water level of the boiler during normal operation under automatic control, that will:
  - (a) automatically stop and prevent the supply of fuel to the boiler if the water in the boiler exceeds a safe operating level specified by the manufacturer; and
  - (b) prevent the boiler from automatically restarting;
- (iv) a device that, each time the boiler is put in use, will adequately purge the furnace chamber of combustible materials so as to ensure safe ignition; and
- (v) a flame failure tripping device that will:
  - (a) detect a flame failure;
  - (b) automatically stop and prevent the supply of fuel to the boiler if a flame failure occurs; and
  - (c) prevent the boiler from automatically restarting.
- (vi) Each steam boiler shall have attached to it:
  - (a) a suitable safety valve (separate from and incapable of being isolated by any stop-valve) which shall be so adjusted as to prevent the boiler being worked at a pressure greater than the maximum permissible working pressure and shall be fixed directly to, or as close as practicable to, the boiler,
  - (b) a suitable stop-valve, connecting the boiler to the steam pipe, which shall be suitably lagged at all times,
  - (c) a correct steam pressure gauge, connected to the steam space and easily visible by the boiler attendant, which shall indicate the pressure of steam in the boiler in kilograms per square centimetre and have marked upon it, in a distinctive colour, the maximum permissible working pressure,
  - (d) at least one water gauge, of transparent material or other type approved by the Director of Factories, to show the water level in the boiler, and, if the gauge is of the glass tubular type and the working pressure in the boiler normally exceeds three kilograms per square centimetre, the gauge shall be provided with an efficient guard but not so as to obstruct the reading of the gauge,
  - (e) where it is one or two or more boilers, a plate bearing a distinctive number which shall be easily visible; and

(vii) Each steam boiler shall be provided with means for attaching a test pressure gauge;

(viii) For the purpose of paragraph (4) (B) (iv) (a) of this regulation, a lever-valve shall not be deemed a suitable safety valve unless the weight is secured on the lever in the correct position

(ix) Paragraph (4) (B) (iv) (b) shall not apply with respect to economisers, and paragraphs (4) (B) (iv) (c), (d) and (e) and paragraph (4) (B)(vii) shall not apply with respect to either economisers or superheaters.

(C) Each hot water boiler in a guarded plant must be equipped with:

(i) a high water temperature tripping device that will:

(a) automatically stop and prevent the supply of fuel to the boiler if the water in the boiler exceeds the safe operating temperature specified by the manufacturer; and

(b) prevent the boiler from automatically restarting; and

(ii) each of the devices described in paragraphs (2)(b), (d) and (e).

#### **Regulation 6 – Registration of Boilers and Pressure Vessels**

- (1) A boiler or pressure vessel to be manufactured in Nigeria shall be designed by a professional engineer who is experienced in the design of boilers, pressure vessels, piping or fittings.
- (2) The design for a boiler or pressure vessel shall bear the signature and seal of the design professional engineer.
- (3) Subject to Regulation 7, no manufacturer shall commence the manufacture of a boiler, pressure vessel, or fitting, unless the design is reviewed and approved by an Authorized Inspector, approval for construction and registered by the Director of Factories.
- (4) Where the designer, manufacturer, installer or owner of a boiler, pressure vessel, fitting or piping proposes a change to a registered design, such change shall be re-submitted to the Authorized Inspector for review and subsequent approval by the Director of Factories before implementation.
- (5) If an Authorized Inspector finds, after its manufacture or installation, that a boiler, pressure vessel, or fitting for which approval for construction was granted is defective, the Authorized Inspector shall report same to the Director of Factories, who may, permit the boiler, pressure vessel, or fitting to be operated or used within such limits of safety as the Authorized Inspector considers adequate in the circumstances and shall require the manufacturer or installer to correct the defects within such period as the Authorized Inspector may allow.

- (6) If the defect found under paragraph (4) of this regulation is due to the design and specifications of the boiler, pressure vessel, fitting or piping, and in the opinion of the Director of Factories, they cannot be remedied, the Director of Factories shall cancel the registration, and no additional boiler, pressure vessel, fitting or piping shall be manufactured or installed based on that design.
- (7) Where a boiler, pressure vessel, or fitting has not been manufactured or installed in conformity with its approved design but nevertheless may be used safely at a lower pressure than its design pressure, the Authorized Inspector after thorough examination and tests, shall fix its maximum allowable working pressure having regard to its design, condition and installation and the purpose for which it is to be operated or used.
- (8) Used boilers, pressure vessels or fittings, not manufactured in Nigeria shall be registered with the Director of Factories, inspected and certified by an Authorized Inspector before it is put to first use in Nigeria.
- (9) Boilers, pressure vessels or fittings already in use before coming into force of this Regulation shall be inspected in accordance with the provisions of these regulations for registration and certification. Defects found during such inspection shall be subject to the provisions of paragraph (4) and (5)

#### **Regulation 7 – Requirements for Registration of Boilers and Pressure Vessels**

- (1) The Director of Factories shall register all boilers or pressure vessels to be manufactured, installed or used in Nigeria and assign a registration number to each one, if the review of the design, quality control program and manufacturing process is found satisfactory by an Authorized Inspector with respect to compliance with the requirements of these regulations.
- (2) An application for registration shall be submitted to the Director of Factories in the prescribed form, with the prescribed fees paid, before commencing construction or installation, as the case may be.
- (3) All drawings, calculations, specifications and other information required for the purposes of an application for registration must be submitted in duplicate.
- (4) With respect to an application for registration of a boiler or pressure vessel, or an alteration to or repair of a boiler or pressure vessel, the drawings, calculations, specifications and other information required with respect to the design shall include:
  - (a) the design pressure and temperature;
  - (b) details of the arrangement and dimensions of all component parts;
  - (c) the material details and specifications as required by the adopted code or standard;



- (d) details of the proposed construction and welded joint configuration;
  - (e) the section and paragraph number of the adopted code under which it is or is to be constructed;
  - (f) a report of any physical tests conducted for the purpose of establishing the maximum allowable working pressure; and
  - (g) any other information that the Director of Factories may require.
- (5) For the purposes of this regulation, the owner of any of the following classes of pressure vessels does not require registration to operate the pressure vessel:
- (a) an air receiver with capacity of 60 litres or less;
  - (b) a propane vessel used in a vehicle as a fuel tank;
  - (c) a propane storage vessel with a capacity of 30 000 litres or less that forms part of a distribution facility that is used to dispense propane to the public;
  - (d) a propane storage vessel with a capacity of 7 500 litres or less that is used for heating purposes in a building or at a construction site or oil field;
  - (e) a propane storage vessel with a capacity of 30 000 litres or less that is used for heating purposes on a farm.

### **Regulation 8 - Registration of Organisations**

- (1) All persons or organisations, involved in the business of manufacturing, constructing, installing, altering or repairing boilers, pressure vessels, fittings or pressure piping systems shall be registered as an approved contractor by the Director of Factories.
- (2) All persons or organisation, involved in the business of inspection, and certification of boilers, pressure vessels, fittings or pressure piping systems shall be registered as an approved inspection agency by the Director of Factories.
- (3) All persons or organisation, involve in the training of power engineers, authorized inspectors, boiler operators and technicians, shall be registered as a training contractor by the Director of Factories.
- (4) Any person or organisation to be so registered as a contractor or approved inspection agency as in paragraphs (1), (2) and (3) of this regulation, shall submit an application in the form prescribed by the Director of Factories and pay the prescribed fees for registration of contractor.

- (5) Any person or organisation so registered as a contractor or approved inspection agency as stipulated in paragraphs (1), (2) and (3), shall be referred to as a registered contractor.
- (6) The Director of Factories may register any person or organisation as a registered contractor upon receipt of and evaluation of:
- (a) an application in the form prescribed by the Director of Factories;
  - (b) payment of the registered contractor's registration fee as prescribed by the Director of Factories; and
  - (c) a successful outcome of an evaluation audit directed by the Director of Factories.
- (7) An application as a registered contractor shall set out the scope of the work that the applicant intends to engage in.
- (8) A registration is valid until the expiry date on the registration, for a maximum term of 3 (three) years, unless the registration is suspended or cancelled before the expiration of the certificate issued.
- (9) The Director of Factories may renew the registration of a registered contractor if, prior to the expiry date, the registered contractor:
- (a) submits to the Director of Factories, a renewal application in the form prescribed by the Director of Factories;
  - (b) pays the registered contractor's renewal fee as prescribed by the Director of Factories; and
  - (c) is successful at the renewal audit preceding the renewal.

(10) Suspension or cancellation of registered contractor registration:

The Director of Factories shall suspend or cancel the registration of a contractor if satisfied that the registered contractor, or an employee of the registered contractor:

- (a) has violated or failed to comply with these Regulations;
- (b) has caused or permitted boiler or pressure vessel under their control to be used in an unsafe condition or while overloaded;
- (c) has performed work on a boiler or pressure vessel in a manner that has impaired the safe operation of the equipment;

- (d) has knowingly permitted any subcontractor or employee of a subcontractor to perform work under the subcontract in a manner likely to impair the safety of persons within the vicinity of the boiler or pressure vessel.

**Regulation 9 – Operation of Boiler and Plants.**

(1) Every employer, occupier, or owner of a boiler, pressure vessel, fitting or piping shall

- (a) ensure that it is maintained in a safe working condition and operated safely.
- (b) have adequate pressure relief devices set to relieve at or below its maximum allowable working pressure in accordance with the adopted code.

(2) No employer, occupier, or owner shall

- (a) operate or use or permit a boiler, pressure vessel, fitting or piping to be operated or used unless a valid certificate of inspection has been issued in respect of the boiler, pressure vessel, fitting or piping.
  - (b) operate or use or permit a boiler, pressure vessel, fitting or piping to be operated or used at a pressure higher than its maximum allowable working pressure as shown in the licence.
  - (c) operate or use or permit a boiler, pressure vessel, or fitting to be operated or used except it is operated, maintained and supervised by appropriately licenced person or contractor.
  - (d) alter, interfere with or render inoperative any fitting that is attached for safety purposes to a boiler, pressure vessel, fitting or piping while it is in operation or use without the consent of an Authorized Inspector.
  - (e) operate or use or permit a boiler, pressure vessel, fitting or piping to be operated or used if it has been sealed by an Authorized Inspector.
  - (f) move a boiler, pressure vessel, fitting or piping that has been sealed to another location for operation or use without the consent of the Director of Factories.
- (3) Where there is any possibility of any gas, vapour or liquid causing injury to a person inspecting, repairing or maintaining a boiler, pressure vessel, fitting or piping, the owner or other person responsible for it or in charge of it shall ensure that,
- (a) a competent person is stationed so as to prevent any gas, vapour or liquid from entering the boiler, pressure vessel, fitting or piping or any part of it; and
  - (b) such other measures are taken to the satisfaction of the person inspecting, repairing or maintaining the boiler, pressure vessel, fitting or piping to ensure his or her safety.

(4) No owner of a refrigeration plant

- (a) with a capacity greater than 45 tonnes but not greater than 100 tonnes shall cause or permit the refrigeration plant to be operated unless it is operated under general supervision by a holder of a refrigeration plant operator's licence, a holder of a refrigeration engineer's licence or the holder of a power engineer's licence of the appropriate class.
  - (b) with a capacity greater than 100 tonnes shall cause or permit the refrigeration plant to be operated unless it is operated under general supervision by a holder of a refrigeration engineer's licence or the holder of a power engineer's licence of the appropriate class.
- (5) The owner of a boiler or refrigeration plant for which supervision is required shall:
- (a) provide a log book in which all information relevant to the operation of the boiler or refrigeration plant is to be recorded;
  - (b) ensure that all information relevant to the operation of the boiler or refrigeration plant is recorded promptly in the log book by the appropriate person;
  - (c) ensure that the log book is kept at the site of the boiler or boiler plant; and
  - (d) ensure that the log book and any information kept is available for inspection in written or printed form for at least five years from the date of the last entry.
- (6) Without limiting the generality of paragraph (5), log book entries shall include:
- (a) with respect to each shift:
    - (i) the time, date, number or designation of the shift;
    - (ii) the printed name and signature of the person providing the supervision of the boiler or refrigeration plant required by these regulations; and
    - (iii) the boiler conditions observed during the shift;
  - (b) a description of any abnormal boiler or boiler plant condition observed and any corrective action required or taken;
  - (c) implemented and maintained continuous boiler water treatment program for the purpose of controlling and limiting corrosion and deposits;
  - (d) any order given that is contrary to, or in addition to, the normal operating procedures, the name of the person giving the order, the time at which the order was given and the reason for giving the order;
  - (e) a description of any preventive maintenance procedures carried out, including the testing and recording of all operation logging, control, alarm and safety systems, and the time at which the procedures were carried out; and
  - (f) a description of any repairs carried out on any part of the boiler or refrigeration plant and the name of any person who carried out the repairs.

### **Regulation 10 - Inspections**

- (1) Every manufacturer or contractor shall ensure that shop inspection of a boiler, pressure vessel, fitting or piping is carried out in accordance with relevant codes adopted in this Regulation at any stage of manufacture.
- (2) Every used boiler, pressure vessel, fitting or piping shall be inspected by an Authorized Inspector before it is put into operation or use and the cost of inspection shall be paid by the owner.
- (3) After an inspection is carried out under paragraphs (1) and (2) of this regulation, if the Authorized Inspector is satisfied that the boiler inspected may be operated or used safely, he or she shall issue a certificate of inspection in accordance with the adopted code and within 28 days, file same with the Director of Factories
- (4) Where a required inspection of a boiler, pressure vessel or piping has not been carried out during its manufacture or its installation, the Director of Factories, shall order for thorough examination to be carried out by an Authorized Inspector to be chosen by the Director of Factories. If found satisfied that the boiler, pressure vessel or piping may be operated or used safely, a certificate of inspection may be issued upon payment of all prescribed fees.
- (5) An Authorized Inspector may require the owner or other person responsible for or in charge of a boiler, pressure vessel or plant to do all things necessary for a proper inspection, including,
  - (a) preparing it for inspection or a test in such manner as the Authorized Boiler Inspector requires and to supply water for any test and to assist in making the test;
  - (b) cutting or drilling holes in the thing being inspected or using any other method to enable the inspector to determine its condition and the thickness of the metal;
  - (c) putting it under pressure or otherwise putting it into operation so that the inspector may test the safety valves or any part of the installation under operating conditions;
  - (d) stopping the application of heat to a boiler or reducing the pressure upon a boiler, pressure vessel, piping or fitting to a designated pressure if the Authorized Boiler Inspector has reason to believe that it is in an unsafe condition; and
  - (e) doing any other thing the Authorized Inspector considers necessary to ensure a proper inspection.

### **Regulation 11 - Periodic inspections**

- (1) Every owner shall:
  - (a) have a boiler inspected by an Authorized Inspector at least ones every twelve (12) months;

- (b) have a refrigeration plant inspected by an Authorized Inspector at least ones every twelve (12) months;
- (c) have a pressure vessel, including steam receiver, steam container and air receiver inspected by Authorized Inspector at least ones every twenty six (26) months.
- (2) having regard to the service conditions and risk factors associated with the pressure vessel, the Authorized Inspector may extend the inspection interval of a pressure vessel for a period not exceeding 5 (five) years.
- (3) Fees connected with inspection as required in these regulations shall be paid by the employer, occupier or owner as the case may be.
- (4) Where construction and service conditions permit, a periodic inspection of a boiler, pressure vessel, refrigeration plant or compressed gas plant shall include an internal inspection.
- (5) Following an inspection, the Authorized Inspector, shall,
  - (a) immediately notify the owner of defects found on the boiler;
  - (b) issue a report on the inspection to the Director of Factories;
  - (c) if satisfied that the boiler or pressure vessel can continue to be operated or used safely, issue a certificate of inspection.
- (6) Where the owner receives a notice under paragraph (2) (a) that the boiler or pressure vessel cannot be operated safely, owner shall seal the boiler or pressure vessel or suspend use of the boiler or pressure vessel until defect is rectified and boiler or pressure vessel certified fit for purpose by the Authorized Inspector.
- (7) The owner of every certified boiler or pressure vessel shall keep the certificate of inspection in good condition and post it in a conspicuous place near the boiler or pressure vessel or, if that is impracticable, at such place as a Factory Inspector may direct.
- (8) When a boiler, pressure vessel or piping is being inspected, the owner or other person responsible for it or in immediate charge of it shall point out to the Authorized Inspector any defect of which he or she has knowledge or that he or she believes to exist in it and, if at any other time, the owner or other person learns of any defect that might render it unsafe to operate or use, he or she shall forthwith notify the Authorized Inspector.

### **Regulation 12 - Report of Inspection**

- (1) An authorized inspector carrying out inspection in accordance with Regulation 11 shall:

- (a) notify the employer, occupier or owner as soon as practicable, of any defect in the boiler or pressure vessel, which in his opinion could compromise the integrity of the boiler or pressure vessel;
  - (b) where there is in his opinion a defect in the boiler or pressure vessel, involving an existing or imminent risk of serious personal injury, immediately notify the employer, occupier or owner and place a prohibition sticker and/ or sign on any such equipment;
  - (c) issue a certificate of test and examination specifying the maximum safe working pressure, signed by him;
  - (d) report the result of every such examination in the prescribed form and containing the prescribed particulars, signed by him and shall within twenty eight (28) days be filed with the Director of Factories.
- (2) Every employer, occupier, owner who has been notified under paragraph (1)(a) of this regulation shall ensure that the boiler or pressure vessel is not used before the defect is rectified.
- (3) Every employer, occupier or owner shall ensure that all certificates and reports which are required to be made under these Regulations are:
- (a) kept available for inspection by a factory Inspector;
  - (b) kept for a period of at least three (3) years from the original date of the report or certificate.

### **Regulation 13 - Alterations**

- (1) No person shall alter a boiler, pressure vessel, fitting or piping unless the alteration is registered and is inspected by an Authorized Inspector.
- (2) No person shall put into operation or use,
  - (a) a boiler or pressure vessel to which an alteration has been made unless a new registration and certificate of inspection have been issued;
  - (b) a piping or fitting to which an alteration has been made unless a new registration has been issued.
- (3) No person shall repair a boiler, pressure vessel, fitting or piping without the prior concurrence of and subsequent inspection by an Authorized Inspector.
- (4) A boiler, pressure vessel, fitting or piping that is altered or repaired under this section shall not be operated or used or be permitted to be operated or used unless it is inspected by an Authorized Inspector.

- (5) Any work of installation, alteration or repair not reported in accordance with paragraph (1)(b) of this regulation, shall be liable to a fine not less than one million naira.

#### **Regulation 14–Obligation to Report**

- (1) The employer, occupier or owner of a boiler, pressure vessel, fitting or piping, upon permanently removing it from operation or use, shall forthwith notify the Director of Factories of the removal in the prescribed form.
- (2) The employer, occupier or owner of a boiler, pressure vessel, fitting or piping shall report any work of installation, alteration or repair of a boiler, pressure vessel or refrigeration plant to the Director of Factories on a prescribed form
- (3) Where an explosion or rupture of a boiler, pressure vessel, fitting or piping occurs, or where an accident arises out of its operation or use that causes injury or death to a person or property damage, the owner shall,
  - (a) forthwith notify the Director of Factories, in person or by telephone, of the occurrence and provide full details; and
  - (b) within 48 hours after the explosion or rupture occurs, send the Director of Factories a written report of the circumstances of the occurrence.
- (4) The Director of Factories or any Factory Inspector under the instruction of the Director of Factories may investigate any matter reported under paragraph (2), or of which he or she becomes aware, to determine its cause.
- (5) Where an explosion or rupture of a boiler, pressure vessel, fitting or piping occurs, no person shall, except for the purpose of saving a life or relieving human suffering, interfere with, disturb, destroy, carry away or alter any wreckage, article or thing at the scene of or connected with the occurrence until permission to do so in writing is given by a Factory inspector.

#### **Regulation 15- Training and Certification of Personnel**

- (1) Every employer, registered contractor or owner shall ensure that all persons involved in the design, manufacture, installation, repair, alteration, maintenance, service, use or disposal of boiler, pressure vessel or piping lifting equipment:
  - (a) have received adequate training for the level of skill and involvement required for safe operation as indicated in these Regulations
  - (b) is competent and have been appropriately certified by the Director of Factories.
- (2) Every employer, registered contractor or owner shall ensure that all persons who operate boilers and pressure vessels have available to them adequate health and



safety information and, where appropriate, written instructions pertaining to the safe operation of the equipment.

- (3) Every employer or occupier shall ensure that those engaged for the purpose of thorough examination of boilers, pressure vessels and pressure piping as stated in Regulation 16 are appropriate and certified by the Director of Factories.

### **Regulation 16- Certificates of Competency**

- (1) Certificates of competency which may be granted by the Director of Factories under this Regulation are:

- (a) Authorized Inspector;
- (b) Certified Power Engineer;
- (c) Certified Refrigeration Engineer;
- (d) Certified Power Technician;
- (e) Certified Refrigeration Plant Technician;

- (2) Eligibility Requirements:

An applicant for certification as competent person by the Director of Factories shall, subject to the requirements of Regulation 16 (3) (A), be in the regular employment of, and exclusively engaged by:

- (i) an Inspection Agency registered by the Director of Factories; or
- (ii) a Registered Contractor involved with the design, manufacture, installation, repair, alteration, maintenance, service, use or disposal of boiler, pressure vessel or piping lifting equipment .

- (3) Qualifications required for certificates of competency:

#### **(A) Authorized Inspector Certification**

- (1) For the purposes of Regulations 15 and 16, a person who conducts an inspection shall hold a valid certificate of competency as an Authorized Inspector.

- (2) The following classes of Authorized Inspector's licences are established:

- (a) Authorized Inspector's class 1 licence;
- (b) Authorized Inspector's class 2 licence;

- (c) Authorized Inspector's class 3 licence.
- (3) An Authorized Inspector's class 1 licence authorizes the holder to inspect a boiler, pressure vessel or refrigeration plant, during construction and installation. An "N" endorsement to a class 1 licence authorizes the holder to inspect boilers and pressure vessels in nuclear plants during new construction.
- (4) An Authorized Inspector's class 2 licence authorizes the holder to carry out in-service inspection of a boiler, pressure vessel or refrigeration plant. An "N" endorsement to a class 2 licence authorizes the holder to carry out in-service inspection of nuclear plants.
- (5) An Authorized Inspector's class 3 licence authorizes the holder to carry out in-service inspection of unfired pressure vessels only.
- (6) An Authorized Inspector's licence issued pursuant to this Regulation is valid for a period of 5 (five) years from the date of issue.
- (7) The Director of Factories may issue a certificate of competency of appropriate class to any person to carry out inspections under this Regulation as Authorized Inspector if he or she pays the prescribed fees, and
- (a) have passed the prescribed examination by the Director of Factories, with respect to the Factories Act, these regulations and the adopted standards
  - (b) is in the regular employ of an Authorized Inspection Agency who is engaged in the business of inspecting boilers and pressure vessels and related equipment;
  - (c) is holding as a minimum, an Ordinary National Diploma in Engineering;
  - (d) holds a valid certificate as Authorized Boiler Inspector, issued by the Federal Ministry of Labour and Employment;
  - (e) possesses at least a five (5) years' experience in boiler manufacturing, repair or inspection, verifiable by a recognised body of Authorized Boiler Inspectors
- (8) A certificate of competency continues in force for the period of 5 (five) years from the date of issue or until the holder ceases to be employed as set out in Regulation 16 (6), whichever occurs first.
- (9) Where a person ceases to be employed as set out in Regulation 16 (6) but is re-employed within two years, the Director of Factories may renew his certificate of competency provided it had not been expired for more than 12 months.
- (10) The holder of a certificate of competency who applies to the Director of Factories for a renewal of the certificate before the expiry of the certificate shall be

issued a renewal if the holder continues to meet the requirements set out in Regulation 16 (6)

- (11) On every inspection of a boiler or pressure vessel, a holder of a certificate of competency shall:
- (a) satisfy himself or herself that the boiler or pressure vessel is being operated or used and maintained in accordance with this Regulation and that the pressure relief devices are properly set and protected against unauthorized adjustment; and
  - (b) review the maximum allowable working pressure of the boiler or pressure vessel and make, or require the owner or operator of the boiler or pressure vessel to make, any reduction in it for safe operation or use having regard to the design, manufacture, age, condition and use of the boiler or pressure vessel.
- (12) Where, in the opinion of an Authorized Boiler Inspector, a boiler, pressure vessel, fitting or piping is in an unsafe operating condition or it is being operated in a dangerous manner, the Authorized Boiler Inspector shall notify the Director of Factories forthwith and the Authorized Boiler Inspector shall take such steps as are necessary to remove the danger, including affixing a seal, disconnecting the power or other means, and the Director of Factories may cancel the certificate of registration or certificate of inspection, as the case may be.

### **(B) Operation Certification**

(1) The following classes of operators' licences are established:

- (a) first class power engineer;
- (b) second class power engineer;
- (c) third class power engineer;
- (d) first class power technician;
- (e) second class power technician;
- (f) refrigeration engineer;
- (g) refrigeration plant technician.

(2) Scope of authority of operators' licences

(a) A first class power engineer's licence entitles the holder to operate as chief engineer or shift engineer of any of the following:

- (i) a high pressure boiler or high pressure boiler plant of any capacity;
- (ii) a low pressure boiler or low pressure boiler plant of any capacity;
- (iii) a refrigeration plant of any capacity.

(b) A second class power engineer's licence entitles the holder to operate as chief engineer or shift engineer of any of the following:

- (i) a high pressure boiler or high pressure boiler plant with a capacity of not more than 10 000 kilowatts;
- (ii) a low pressure boiler or low pressure boiler plant of any capacity;
- (iii) a refrigeration plant of any capacity; and

(c) A third class power engineer's licence entitles the holder to operate as chief engineer or shift engineer of any of the following:

- (i) a high pressure boiler or high pressure boiler plant with a capacity of not more than 2000 kilowatts;
- (ii) a low pressure boiler or low pressure boiler plant of any capacity;
- (iii) a refrigeration plant with a capacity of not more than 500 tonnes;

and

(d) A first class power technician's licence entitles the holder to operate without supervision on any of the following:

- (i) a low pressure boiler or low pressure boiler plant with a capacity of not more than 5000 kilowatts;
- (ii) a high pressure boiler with a capacity of not more than 500 kilowatts;

(e) A fifth class power engineer's licence entitles the holder to operate without supervision on any of the following:

- (i) a low pressure boiler or low pressure boiler plant with a capacity of not more than 2000 kilowatts;
  - (ii) a high pressure boiler with a capacity of not more than 300 kilowatts;
- and

(f) A refrigeration engineer's licence entitles the holder to operate a refrigeration plant of any capacity.

(g) A refrigeration plant technician's licence entitles the holder to operate a refrigeration plant with a capacity of not more than 100 tonnes.

(3) Application for operator's licence:

(a) An applicant, having passed the prescribed exam, shall be issued an operator's licence by the Director of Factories with an endorsement of the area of competence passed;

(b) An operator's licence issued pursuant to this Regulation is valid for a period of 5 (five) years from the date of issue.

**(C) Pressure Welder Certification**

- (1) No welder is permitted to weld on a boiler, pressure vessel or fitting, without a valid licence from the Director of Factories.
  - (2) The following classes of pressure welders' licences are established:
    - (a) Class MW - manual welding;
    - (b) Class SW - semi-automatic/machine welding.
  - (3) A Class MW pressure welder's licence authorizes the holder to weld on boilers, pressure vessels, pressure piping systems and refrigeration plants using a manual welding process specified in the licence and subject to any limitations with respect to welding variables that are specified in the licence.
  - (4) A Class SW pressure welder's licence authorizes the holder to weld on boilers, pressure vessels, pressure piping systems and refrigeration plants using a semi-automatic or machine welding process specified in the licence and subject to any limitations with respect to welding variables that are specified in the licence.
  - (5) The Director of Factories may issue a pressure welder's licence of the appropriate class to a person who passes a pressure welder's qualification test pursuant to the provisions of this Regulation.
  - (6) A pressure welder's qualification test shall be administered to a person by a licenced contractor having in its employment a certified welding engineer approved by the Director of Factories.
  - (7) On behalf of a person who satisfactorily passes the welder's qualification test, the licenced contractor shall apply in writing to the Director of Factories for a licence of the appropriate class and shall:
    - (a) submit the record of the welder qualification test issued to the person; and
    - (b) pay the prescribed fees.
  - (9) The Director of Factories may specify in a licence issued pursuant to paragraph (7) the processes that the holder is qualified to carry out and any limitations with respect to welding variables that the Director of Factories considers appropriate.
  - (8) A pressure welder's licence issued pursuant to this regulation expires 2 (two) years after the date of issue.
- (4) Issue of a certificate of competency:

The Director of Factories may issue a certificate of competency if the applicant:

- (a) have taken and passed the competency certification examination as prescribed by the Director of Factories;
- (b) have submitted appropriate application endorsed by the applicant's employer in form prescribed by the Director of Factories;
- (c) have fulfilled relevant sections of the requirements of paragraphs (3) (A), (B) or (C) above; and
- (d) have paid the prescribed fees for issue of such competency certificate.

(5) Period in force of a certificate of competency:

A certificate of competency is valid until the expiry date on the certificate, for a maximum term of 5 (five) years, unless the certificate is suspended or cancelled before the expiration date.

(6) Renewal of a certificate of competency:

- (a) The Director of Factories may renew a certificate of competency issued to a person upon receipt from the person of:
  - (i) an application for renewal, in the form prescribed by the Director of Factories, endorsed by the applicant's employer;
  - (ii) payment of the renewal of certificate of competency fee prescribed by the Director of Factories; and
  - (iii) evidence of training, continued education and practice attested by the Guild of Authorized Boiler Inspectors (GABI).
- (b) If a certificate of competency issued to a person is not renewed under paragraph (6) (a), the Director of Factories may, at any time within the 12(twelve) months following the expiry date, reinstate the certificate upon receipt from the person, an application with other documents required in paragraph (6) (a).
- (c) If a person fails to renew or have reinstated a certificate of competency under paragraph (6)(a) or (b), any subsequent application is subject to the application requirements in paragraph (4) for the issue of a certificate.

(7) Reasons for suspension or cancellation:

The Director of Factories may suspend, cancel or refuse to renew a certificate of competency if satisfied that the holder of the certificate:

- (a) is not competent or lacks reasonable skills;
- (b) has failed to comply with a relevant enactment;
- (c) has been wilfully negligent in his duty as a competent person or an authorized inspector;
- (d) has knowingly falsified report on activities where his professional competence is required;

(8) Lost or mislaid certificate of competency:

If a certificate of competency is lost, or so damaged that it is unusable, a replacement may be supplied upon payment of the applicable fee prescribed by the Director of Factories.

#### **Regulation 17 - Administration of Certificate of Competency Examination**

- (1) All competency certification examinations shall be administered by the Director of Factories in consultation with Examination Board to be constituted by the Director of Factories.
- (2) The Examination Board shall ratify the requirements, structure, venue and passing grade of an examination.
- (3) Membership of the Board shall consist of the following 7 (seven) members:
  - (a) a nominee appointed by the recognised body of Authorized Boiler Inspectors;
  - (b) 2 (two) nominees from the industry;
  - (c) a nominee from Department of Petroleum Resources (DPR);
  - (d) a nominee from Nigeria Maritime Administration & Safety Agency (NIMASA);
  - (e) a nominee from Standards Organisation of Nigeria (SON);
  - (f) a nominee from the Federal Ministry of Labour & Employment, appointed by the Director of Factories.
- (4) A member of the Examination Board holds office for a term not exceeding 2 (two) years and may be reappointed ones thereafter.

- (5) For an examination to hold, at least 5 (five) out of the 7 (seven) member board must consent to the requirements, structure and passing grade for that examination.

### **Regulation 18 - Application for examination**

- (1) A candidate for any examination shall apply to the Director of Factories in the prescribed form and submit the application with the prescribed fee for that examination.
- (2) Requirement for operating experience to qualify for an examination, shall be submitted by candidates, with a written verification of operating experience from the Guild of Authorized Boiler Inspectors and the employer or employers in whose service the candidate has acquired the operating experience.
- (3) A candidate for second class power technician and refrigeration plant technician examination need not submit verification of operating experience.
- (4) If a false or misleading statement is made in an application for any examination or in any reference or other evidence of qualification submitted by or on behalf of a candidate, the Director of Factories may deny the application.
- (5) If the discovery of a false or misleading statement described in paragraph (4) is made after a certificate of qualification has been issued, the Director of Factories may cancel the certificate.
- (6) Subject to paragraph (2), a person who applies to be accepted as a candidate for an examination pursuant to these regulations must submit evidence satisfactory to the chief inspector that the person has operating experience of the kind and duration required for the class of examination applied for.

(a) First class power engineer's certificate:

A person may be accepted as a candidate for examination for a first class power engineer's certificate if the person is the holder of a valid second class power engineer's certificate and, since the issue of that certificate:

- (i) for at least 36 (thirty six) months, has operated as shift engineer of a high pressure boiler or high pressure boiler plant with a capacity greater than 10000 kilowatts; and
- (ii) for at least 36 (thirty six) months, has performed in a supervisory capacity acceptable to the Director of Factories on the design, construction, installation, repair, maintenance or operation of pressure equipment.

(b) Second class power engineer's certificate:

A person may be accepted as a candidate for examination for a second class power engineer's certificate if the person is the holder of a valid third class power engineer's certificate and, since the issue of that certificate:



(i) for at least 18 (eighteen) months, has operated as shift engineer a high pressure boiler or high pressure boiler plant with a capacity greater than 5000 kilowatts;

(ii) for at least 24 (twenty four) months, has performed in a supervisory capacity acceptable to the Director of Factories on the design, construction, installation, repair, maintenance or operation of pressure equipment.

(c) Third class power engineer's certificate:

A person may be accepted as a candidate for examination for a third class power engineer's certificate if the person:

(i) is a graduate engineer;

(ii) has successfully completed an approved course in power engineering leading to a third class power engineer's certificate delivered by the Guild of Authorized Boiler Inspectors;

(iii) has at least 24 (twenty four) months' experience as a process operator in a role acceptable to the Director of Factories

(d) First class power technician's certificates:

A person may be accepted as a candidate for examination for a first class power technician's certificate if the person holds a second class power technician certificate and, since the issue of that certificate:

(i) for at least 24 (twenty four) months, has operated as a second class boiler technician of a high pressure boiler or high pressure boiler plant with a capacity greater than 5000 kilowatts; and

(ii) has at least 60 (sixty) months experience in the operation and maintenance of boilers and related equipment and has completed an approved course specifically related to boilers and related equipment, delivered by the Guild of Authorized Inspectors.

(e) Refrigeration engineer's certificate:

A person may be accepted as a candidate for examination for a refrigeration engineer's certificate if the person:

(i) is a graduate engineer;

(ii) has successfully completed an approved course related to refrigeration engineering delivered by the Guild of Authorized Boiler Inspectors;

(iii) has at least 60 (sixty) months' experience in the operation and maintenance of refrigeration plant.

**Regulation 19 - Forgery of certificates, false entries and false declarations.**

If any person -

- (a) forges or counterfeits any certificate required by, under or for the purposes of, these Regulations or any order made thereunder; or
- (b) gives or signs any such certificate knowing it to be false in any material particular; or
- (c) knowingly utters or makes use of any such certificate so forged, counterfeited or falsified as aforesaid; or
- (d) knowingly utters or makes use of, as applying to any person, any such certificate which does not so apply; or
- (e) personates any person named in any such certificate; or
- (f) falsely pretends to be an inspector, an approved person or a competent person; or
- (g) wilfully connives at any such forging, counterfeiting, giving, signing, uttering, making use, personating or pretending as aforesaid; or
- (h) wilfully makes a false entry in any register, notice, certificate or documents required by, under, or for the purposes of these Regulations or any order made thereunder, to be kept or served or sent; or
- (i) wilfully makes or signs a false declaration required by, under, or for the purposes of, these Regulations or any order made thereunder; or
- (j) knowingly makes use of any such false entry or declaration as aforesaid,

he shall, without prejudice to any other penalty, be guilty of an offence under this Regulation, and liable on conviction to a fine not exceeding N500,000 (five hundred thousand naira only) or to imprisonment for a term not exceeding 12 ( twelve) months or to both such fine and imprisonment.

### **Regulation 20- Accident Investigation**

- (1) The Director of Factories may inaugurate an Ad hoc Accident Investigation team to investigate cause of accidents involving boilers, pressure vessels, and pressure piping systems. Membership of the team shall consist of the following 3 (three) members:
  - (a) a professional engineer with experience in the design, construction, installation and operations of boiler and pressure vessels who has been practicing for at least 5 (five) years;

- (b) an authorized inspector who has been practicing for at least 5 (five) years;
  - (c) an Inspector of Factories, experienced in boiler and pressure vessel operations.
- (2) A member of the Accident Investigation Board shall not have any direct or indirect interest in the matter being investigated.
  - (3) All matters adjudicated by the Accident Investigation Board can be referred to the Appeal Board, if any of the parties is not satisfied with the outcome.

### **Regulation 21 - Powers of Factory Inspectors**

- (1) A Factory Inspector shall, for the purpose of the execution of this Regulation, have power to do the following:
  - (a) call on any factory or premises to audit the compliance of the employer, occupier or owner to these Regulations when he has reasonable cause to believe that any person is employed and boiler and pressure vessels are manufactured, fabricated or used therein;
  - (b) In cases where a factory inspector, appointed by the Director of Factories has reasonable grounds for considering that a boiler, pressure vessel or a refrigeration plant is unsafe, the following action may be taken:
    - (i) the Inspector may, by written notice, require a test and thorough examination to be carried out by an Authorized Inspector of his choice at the expense of the employer, occupier or owner;
    - (ii) once the notice is served, the boiler, pressure vessel or a refrigeration plant must not be used until the test and thorough examination has been carried out and the Authorized Inspector who carries out the test and examination has issued a report and has specified that the boiler, pressure vessel or refrigeration plant is safe for further use.
  - (c) to exercise such other powers stipulated in Sections 65 and 66 of the Factories Act that may be necessary for giving full effect to the provisions of this Regulation.

### **Regulation 22 - Appeals**

Appeals that arise in any matter before it shall be directed to the Appeal board as constituted under the Act, and a decision or order of the Appeal Board is final and binding and not open to review except in the case of an error of law or jurisdiction.