



**LEGAL NOTICE NO.....**

**THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION  
ACT**

*(NO. 8 of 1999)*

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**THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION  
ACT, 1999**

*(NO. 8 of 1999)*

**IN EXERCISE** of the powers conferred by sections 147 of the Environmental Management and Co-ordination Act the Minister for Environment and Mineral Resources makes the following Regulations-

**THE ENVIRONMENTAL MANAGEMENT AND  
CO-ORDINATION  
(AIR QUALITY) REGULATIONS, 2009**

**PART 1-PRELIMINARY**

Citation.

**1.** These regulations shall be cited as Environmental Management and Co-ordination (Air Quality) Regulations, 2009, and shall come into operation on such date as the Minister may, by notice in the Gazette, appoint.

Interpretation.

**2.** In these Regulations unless the context otherwise requires:

“Act” means the Environmental Management and Co-ordination Act of 1999;

“ aerosol” means suspension in a gaseous medium of solid particles, liquid particles or solid and liquid particles having a negligible falling velocity;

"air pollutant" means –

(a) any fume, smoke, particulate matter, vapour,

gas, odorous substance or any combination thereof; or

(b) any other substance or matter whether

physical, chemical, biological, or radioactive, including source material, special nuclear material, and by-product materials,

which is emitted into or otherwise enters the atmosphere from any object or activity and causes, or, if unabated, may cause air pollution, but does not include water vapour, steam condensate or any other emission exempted under these Regulations;

“air pollution” means any change in the composition of air caused by air pollutants;

"applicant" means an applicant for a licence under these Regulations;

“air quality” means the concentration prescribed under or pursuant to the Act of a pollutant in the atmosphere at the point of measurement’;

“air quality effect” means a series of observed relationships between air pollutants and their effects on health, welfare, vegetation, or property.

“air quality standard” means an air quality level as established by these Regulations setting a limit of contaminant levels in the atmosphere;

“Authority” means the National Environment Management Authority established under section 7 of the Act;

“ambient air” means the atmosphere surrounding the earth and does not include the atmosphere within a structure or within any underground space;

“ambient air quality standard” means the quality of the ambient air specified under these Regulations as being safe for human health;

“bag filter” means fabric shaped to remove particles from a gas stream by filtration;

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“Bureau” means the Kenya Bureau of Standards established under the Standards Act;

“competent person” in relation to any duty or function, means a person who has adequate training, relevant qualifications and experience to enable him to perform that duty or function;

“controlled areas” means any area designated as such by the Minister under Regulation 11;

“control Order” means the instructions to a proponent issued in writing in order to comply with the specific legal requirements;

“cyclone” means dust (and grit) or droplet separator utilizing essentially the centrifugal force derived from the motion of the gas;

“dioxins” includes any of the chlorinated hydrocarbon compounds known chemically as dibenzo-p-dioxins, chlorinated dibenzofurans and certain polychlorinated biphenyls;

“Director-General means the Director-General of the Authority”.

“electrostatic precipitator” means a device for removing particles from a gas stream;

‘emission’ means discharge of pollutants into the atmosphere from any source;

‘emission rate’ means mass or other physical quality of pollutant transferred into the atmosphere per unit time.

“emission limits” means the permissible levels of emission (of pollutants set out in the Third Schedule;

“equipment shut-down” means the process of taking a unit of equipment off-line from an operative condition such that normal production rates are not being achieved;

“equipment start-up” means the process of bringing a unit of equipment on-line from an inoperative condition such that normal production rates are being achieved;

“exposure limit” means the standards of exposure or discharge or emissions established under the Act or under these Regulations;

"excessive emission" means emission of an air pollutant in excess of an emission standard or emission target;

"existing facility" means any facility having an air pollutant source that is constructed, or in operation, installed, or used, in Kenya on or before the commencement of these Regulations;

"existing source" means an air pollutant source that is constructed, in operation, installed or in use in Kenya on or before the commencement of these Regulations;

"facility" means any building, structure, establishment, installation, plant, works or activity that emits an air pollutant;

"fugitive emission" means an emission that cannot or is not reasonably likely to pass through a stack, chimney, vent or other functionally equivalent opening;

"greenhouse gas" means gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation and includes gases listed under Part III of the Second Schedule;

"guideline document" means the most recent ambient air quality guideline document issued by the Authority;

“fume” means an aerosol of solid particles, usually from metallurgical processes, generated by condensation from the gaseous state, generally after volatilization from melted substances and often accompanied by chemical reactions such as oxidation.

“harmful substance” means any substance whether liquid, solid or gaseous which is hazardous or potentially hazardous to human or the

environment and includes objectionable odours, radio-activity, and temperature;

“hydrocarbon” means any organic compound consisting predominantly of carbon and hydrogen;

“incineration” means the process of igniting and burning solid, semi-solid, liquid, or gaseous combustible waste to their products of combustion;

"incinerator" means any equipment, device or contrivance used for the destruction, by burning, of solids, liquids or gaseous wastes, other than any equipment, device or contrivance used exclusively to burn wood wastes;

“indoor air” means air within an enclosed space, e.g. dwelling or public building;

“Kenya Standard” means a standard developed or adopted by the Kenya Bureau of Standards;

“licence” means an air pollutant discharge licence granted under these Regulations;

"licensee" means a person who is granted a licence under these Regulations;

"level" means concentration of a pollutant in ambient air or the deposition thereof on surfaces over a given time;

"limit value" means level fixed on the basis of scientific knowledge, with the aim of avoiding, preventing or reducing harmful effects on human health or the environment as a whole (or both), to be attained within a given period and not to be exceeded once attained;

"malfunction" means any sudden, infrequent and not reasonably preventable failure of air pollution control equipment, process or process equipment, to operate in a normal manner, but does not

include any failure that is primarily caused by poor maintenance or negligent operation;

“measurement” means periodic evaluation of workplaces and organizational management systems in a, factory or workplace for prevention of accidents, occupational diseases, ill-health or damage to property;

“mobile source” means a moving producer of air pollution, mainly forms of transport including motorcycles, cars, trucks, trains, ships and aeroplanes;

‘monitoring’ means any periodic or continuous surveillance or testing to determine the level of compliance with statutory requirements or pollutant levels in various media or in humans, animals, and other living things.

"new facility" means any facility, other than an existing facility, having an air pollutant source that commenced construction or operation or was installed in Kenya after the commencement of these Regulations;

"new source" means an air pollution source that commenced construction or operation or was installed in Kenya after the commencement of these Regulations;

"nitrogen oxides" means the sum of nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>) expressed collectively as a nitrogen dioxide equivalent;

“non-point source” means a source of atmospheric emissions which cannot be identified as having emanated from a single identifiable source or fixed location, and includes bush, forest and open fires, mining activities, agricultural activities and stockpiles;

“occupational air quality” means the concentration prescribed under or pursuant to the Act of a substance or energy in the atmosphere within a structure or underground space in which human activities take place;

“odour” means property of substance that stimulates characteristic smell;

“odour panel” means group of individuals who compare the odour intensity of a substance to a reference scale, or who identify a substance by means of its odour;

“offensive odour” means any smell which is considered to be malodorous or a nuisance to a reasonable person;

“opacity” means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background;

“owner” means any person who owns or operates a facility, source, or air pollution control equipment, as the case may be;

“ozone-depleting substance” means a substance having chemical or physical properties which, by its release into the atmosphere, can cause a depletion of the stratospheric ozone layer;

“particulate matter” includes foot dust, fly ash, cinders, and other solid particles of any kind;

“particulates” means fine liquid or solid particles including dust, smoke, mist, fumes, or smog found in air or emissions;

“point source” means a single identifiable source and fixed location of atmospheric emission, and includes smoke stacks and residential chimneys;

“pollutant” includes any solid, liquid, vapour, gas or aerosol, or combination hereof;

“PM<sub>2.5</sub>” means particulate matter with an aerodynamic diameter of less than or equal to a nominal 2.5 micrometers, as determined by the appropriate reference methods listed under the Eleventh Schedule ;

"PM<sub>10</sub>" means finely divided solid or liquid material, with an aerodynamic diameter less than or equal to ten micrometers emitted to the ambient air as measured by applicable reference methods listed under the Eleventh Schedule, or an equivalent or alternate method approved by the Authority;

"prescribed burning" means open burning under such conditions that the fire is confined to a predetermined area;

"primary ambient air quality standards" means those ambient air quality standards which, in the judgment of the Authority, are requisite to protect the public health and allow an adequate margin of safety;

"pollutant" means an air pollutant directly emitted from a source, as compared to secondary pollutant which is formed in the atmosphere;

"priority pollutant" means an air pollutant specified in the Second Schedule;

"prescribed area" means an area prescribed by the Minister by order pursuant to the Act;

"reference method" means any method specified in the Eleventh Schedule for sampling and analyzing for an air pollutant;

"regulated air pollutant" means any pollutant for which there is a national ambient air quality standard;

"Ringlemann number" means value representing the darkness of a plume of smoke assessed by visual comparison with a set of grids numbered from 0(white) to 5 (black) (Ringlemann Chart);

"Ringlemann Smoke Chart" means the chart published and described in the Relevant Kenya Standard, or any chart, recorder, indicator, or device for the measurement of smoke density which is approved by the Authority as the equivalent of the said Ringlemann Scale;

“scrubber” means device by which particulate or gaseous contaminants are removed from a gaseous stream by contact with or impingement on wet or dry surfaces, or by use of liquid sprays;

“secondary pollutants” means pollutants which may be produced in the atmosphere by physical or chemical processes from primary pollutants or other substances present as the result of emissions from stationary or mobile sources.

“smoke” means visible aerosol or small gas-borne particles resulting from incomplete combustion of materials, predominantly of carbon and other combustible material;

“soot” means carbonaceous particles formed in incomplete combustion and deposited before emission;

“stack” means a flue, chimney, conduit or other device constructed for the purpose of discharging air contaminants into the atmosphere;

“stack height” means the vertical distance measured in metres between the points of discharge from a stack into the atmosphere and the land thereunder;

“stationary source” means any fixed building, structure, facility, installation, equipment or any motor vehicle, waterborne craft, aircraft or diesel locomotive deposited, parked, moored, or otherwise remaining temporarily in place, which emits or may emit any air pollutant;

“sulphuric acid plant” means any facility producing sulphuric acid by the contact process of burning elemental sulphur, alkylation’s acid, hydrogen sulphide, organic sulphides and mercaptans, or acid sludge, but does not include facilities where conversion to sulphuric acid is utilized primarily as a means of preventing emissions to the atmosphere of sulphur dioxide or other sulphur compounds;

"start up" means the setting into operation of a facility, or sources in a facility, as the case may be, for any purpose;

"shut down" means the cessation of operation of a facility or source, as the case may be, for any purpose;

"Standard conditions" means a temperature of 293° K (20°C) and a pressure of 101.3 kilopascals (29.92 in Hg);

“suspended particulate matter” means all particulate material which persists in the atmosphere or in flue gas stream for lengthy periods because the particles are too small in size to have appreciable falling velocity;

“threshold limit value” means exposure guideline that refer to level of harmful agent and it is believed to represent conditions under which nearly all workers maybe repeatedly exposed day after day without adverse effect;

“vehicle testing center” means any registered garage/workshop approved by the motorvehicle inspection unit for the purposes of inspecting motor vehicles on exhaust emissions,

“visible air pollutants” includes particulate matter or smoke; on exhaust emissions

‘volatile organic compounds’ means any organic compound with a boiling point of below 145°C which participates in atmospheric photochemical reactions;

“vapour “ means gaseous phase of matter that can exist simultaneously in a liquid or solid state;

“worker” includes a person who has entered into or works under a contract of service or apprenticeship, written or oral, express or implied, whether by way of manual labour or otherwise;

“workplace” includes any land, premises, location, vessel or thing at, in, upon or near where an employee is, in the course of employment;

Objective.

**3.** The objective of these Regulations is to provide for the

prevention, control and abatement of air pollution to ensure clean and healthy ambient air.

Application.

4. (1) These regulations shall apply to:-

- (a) all internal combustion engines,
- (b) all premises, places, processes, operations, or works to which the provisions of the Act and Regulations made thereunder apply and
- (c) any other appliance or activity that the Minister may by order in the Gazette, specify.

(2) The provisions of these regulations shall be in addition to other requirements imposed by or under the Act or any other written law.

Exemptions .

(3) Notwithstanding Sub-Regulation (1), the following operations shall be permissible under these regulations provided that they are not used for the disposal of refuse-

- (a) back-burning to control or suppress wildfires;
- (b) fire fighting rehearsals or drills conducted by fire service agencies;
- (c) traditional and cultural burning of savanna grasslands;
- (d) burning for purposes of public health protection; and
- (e) emissions of air pollutants from all stationary and mobile sources as set out under the Part I of the Fifth schedule.

(4) Where, in relation to a particular air pollutant or air pollutant source, there are no emission standards, targets or guidelines set out in these Regulations, the Authority may apply, subject to such

modifications, if any, as the Authority may deem fit, any Internationally recognized emission standards, targets or guidelines in relation to the air pollutant or air pollutant source.

(5) For the purposes of subregulation (4) the Authority in consultation with relevant lead agencies shall within six months of the coming into operation of these Regulations, formulate the National Emission Standards for air pollutants such as those stipulated under Third Schedule.

## **PART II - GENERAL PROHIBITIONS**

Emissions Air  
Pollution.

**5. (1) No person shall-**

- (a) act in a way that directly or indirectly causes, or is likely to cause immediate or subsequent air pollution; or
- (b) emit any liquid, solid or gaseous substance or deposit any such substance in levels exceeding those set out in the First Schedule.

Priority air  
pollutants.

**6. No person shall cause emission of the priority air pollutants prescribed in the Second Schedule to exceed the ambient air quality limits prescribed in the First Schedule.**

Ambient air  
quality.

**7. No person shall cause the Ambient Air Quality levels specified in the First Schedule of these Regulations to be exceeded.**

Suspended  
particulate matter.

**8. (1) No person shall cause or allow particulate emissions into the atmosphere from any facility listed under the Fourth Schedule to these Regulations in excess of those limits stipulated under the Third Schedule.**

Odour guidelines.

**9. Any person, being an owner of premises, who causes or allows the generation, from any source, of any odour which unreasonably interferes, or is likely to unreasonably interfere, with any other person's lawful use or enjoyment of his property shall use recognised**

good practices and procedures to reduce such odours to a level determined by the odour panel, including any guidelines published by the Authority for reducing odours.

### **PART III - PERMISSIBLE LEVELS**

Review of priority pollutants.

**10.** (1) The Authority shall in consultation with relevant lead agencies, from time to time review the list of priority pollutants set out under the Second Schedule and the ambient air quality levels provided for in the First Schedule and prescribe the permissible levels thereof.

Setting ambient air quality limits.

(2) The Authority shall in setting limits for ambient air quality levels as stipulated in the First Schedule take into account the limit-determining factors set out under Part III of the Fifth Schedule;

### **PART IV - CONTROLLED AREAS**

Air quality controlled areas.

**11.** No person shall cause pollution in a controlled area listed under the Sixth Schedule so as to exceed the limits stipulated under the First Schedule.

Declaration of a controlled area.

**12.** (1) The Minister may in consultation with the Authority declare an area as a controlled area where-

- (a) ambient air quality standards are being or are likely to be exceeded in the area, or any other situation exists which is causing, or is likely to cause, a significant negative impact on human health, environment and national heritage; or
- (b) the area requires a specific air quality management action plan to rectify the situation.

(2) The declaration of a controlled area under subregulation (1) may be withdrawn by the Minister after consultation with the Authority if the area is in compliance with ambient air quality standards for a period of at least three months or as may be deemed fit by the Authority.

**13. (1)** The Authority shall, within three months after the declaration of a controlled area under Regulation 12, in consultation with the relevant lead agencies prepare an area air quality management plan for the area and submit the same to the Minister who shall publish the same in the Gazette.

(2) A controlled area air quality management plan -

- (a) shall be aimed at coordinating air quality management in the area;
- (b) shall address issues related to air quality in the area; and
- (c) may, for the purposes of implementation, provide for the establishment of a committee representing relevant stakeholders.

(3) A controlled area management plan shall lapse upon the withdrawal of the declaration of the controlled area under Sub-regulation 12(2).

## **PART V - STATIONERY SOURCES**

**14.(1)** No person, operator or owner operating a controlled facility specified in the Fourteenth Schedule shall-

- (a) cause emission of any pollutant listed under the Second Schedule from any point sources without a valid emission licence issued in accordance with the provisions of the Act;
- (b) cause emission of any air pollutant listed under the Second Schedule from any point sources in levels exceeding the limits set out under the Third Schedule.

(2) Any facility not listed under the Fourteenth Schedule which is found to be in contravention of this regulation more than three times within a period of six months shall be required to apply for an emission licence under Regulation 39.

(3) No person shall cause or allow the emission of visible air pollutants from a stationery source in excess of the limits set out in the Third Schedule.

(4) The provisions of sub-regulation (1) (b) shall not apply to the start-up and shut-down of equipment in respect of which an emission licence has been issued under these Regulations.

Emission standards.

**15.** No person, owner or operator of a facility shall cause or allow the emission of air pollutants in excess of the limits stipulated under the Third Schedule.

Air pollution control systems.

**16.(1)** The control systems set out in the Seventh Schedule shall be used by all persons whose operations cause or are likely to cause the emission of pollutants in excess of the limits set out in the Third Schedule.

(2) Any waste or other by-product of a system referred to in subregulation (1) shall be disposed of or treated in accordance with regulations made in that respect under this Act.

(3) The emission reduction measures set out under Part IV of the Fifth schedule shall be applied in the operation of burners.

Exposure report format.

**17.** The owner or operator of a controlled facility shall ensure that exposure of workers to occupational air pollutants is monitored and recorded in accordance with the Tenth Schedule.

Excessive Emissions.

**18.** A licensee shall report to the Authority any event resulting in an excess emission-

(a) by giving a notice of such event, in Form II set out in the Ninth Schedule, within twenty-four

hours after the occurrence of the event; and

- (b) by delivering a written report to the Authority within fourteen days after the occurrence of the event, describing the circumstances surrounding the event and the corrective measures taken or planned to be taken to prevent future occurrence of the same.

Emission report.

**19.** (1) A licensee shall submit an emissions report in respect of each calendar year to the Authority within six months after the end of that calendar year, unless otherwise directed by the Authority.

(2) An emissions report shall contain information on the matters set out in part V of the Fifth Schedule.

Air quality at property boundary.

**20.** No person, operator or owner of any facility shall cause or allow fugitive emissions to cause the ambient air quality at its property boundary to exceed the limits prescribed under the First Schedule.

Control order.

**21.**(1) A control order may be issued in anticipation of a breach of any provision of these Regulations or of any term or condition of a licence, or in response to such breach.

(2) The owner or operator of a facility from which the fugitive emissions cause ambient air quality limits specified under the First Schedule to be exceeded shall institute remedial measures recommended under Part VI of the Fifth Schedule.

(3) A control order shall-

(a) specify the breach in respect of which it is issued;

(b) specify the steps to be taken to ameliorate the effects of the breach;

(c) specify the time within which the steps shall be taken; and

(d) may, where appropriate, require the immediate cessation of the breach;

(4) Any person who fails to comply with the provisions of a control order issued under this regulation commits an offence and shall be liable on conviction to a fine not exceeding one hundred thousand or imprisonment for a term not exceeding three years;

Fugitive emission control plan.

**22.**(1) The Authority may, as part of the requirements of an application for emission licence for a controlled facility with a fugitive emission air pollutant source, or as part of a requirement of a control order under regulation 21, require the applicant to submit a written fugitive emission control plan for the control of fugitive particulate emissions, if –

(a) the facility has a fugitive emissions source operating with emissions in excess of 20% opacity as determined by methods prescribed under Part VII of the Fifth schedule of these Regulations;

(b) the facility has a fugitive emissions source operating with visible emissions that are being transported off the boundary of the property on which the source is located; or

(c) in relation to the facility, the ambient air quality standard for total suspended particulates or for PM<sub>10</sub> specified in these Regulations is being exceeded at a location off the boundary of the property on which the source is located.

(2) The Authority shall review a fugitive emission control plan within forty-five days of the receipt thereof, and shall, before the end of that period, notify applicant as to whether the plan is approved, disapproved, or if further information is required-

Provided that where a fugitive emissions control plan is submitted as part of the requirements of a licence application, such plan shall be reviewed along with all other aspects of the application and all provisions relating to the time period for review of licence applications shall apply to the review of such plan.

(3) Where a fugitive emission control plan is disapproved, the notification of the disapproval of the plan shall –

- (a) be given to the licensee within twenty-one days, setting out the reasons thereof; and
- (b) inform the licensee that he is entitled to revise and resubmit the plan within thirty days of the date of delivery of such notification.

(4) If after the review of a resubmitted fugitive emission control plan there remain aspects of the plan that are unsatisfactory to the Authority, the Authority may approve the plan subject to such terms, conditions or modifications as it thinks necessary in order to eliminate or mitigate the unsatisfactory aspects of the plan.

(5) Where a plan is made subject to any term, condition or modification under paragraph (4), the notification of the approval of the plan shall contain a written statement of the reasons for the term, condition or modification, as the case may be.

(6) The Authority may periodically review any fugitive emission control plan approved by it and if the Authority determines that the objectives of the plan are not being met, it shall require the submission of a revised plan within sixty days after such request.

(7) For the purposes of this regulation, fugitive emission air pollutant sources shall include those indicated in Part VIII of the Fifth Schedule.

Fugitive emission reduction measures.

**23.** A fugitive emission control plan may require the employment of measures or operating procedures indicated in Part VI of the Fifth Schedule.

## **PART VI - MOBILE SOURCES**

Internal combustion engines General.

**24.** The Authority shall ensure that emissions from all internal combustion engines are monitored in accordance with the methods set out under the Eleventh Schedule.

Vehicular emission sources.

**25.** (1) No person shall cause or allow the emission of visible air pollutants from a stationary vehicle in excess of the limits set out under the prescribed Kenya Standard.

Control of vehicular emissions .

(2) Every operator or owner of a mobile emission source including road, rail, air, marine and inland water transport and conveyance equipment, shall control the emission of priority air pollutants set out in the Second Schedule.

Vehicular emission limits.

(3) The emissions from an internal combustion engine shall not exceed the limits prescribed under the prescribed Standard.

Methods of test.

(4) The vehicular emissions shall be tested in accordance with the prescribed standard or any other method approved by the Authority in consultation with the Bureau.

(5) Any person who causes emissions from a mobile source in excess of the prescribed standards commits an offence.

(6) In this Regulation “prescribed standard” means the Kenya Standard prescribing codes of practice for the inspection of motor vehicles.

Inspection of motor vehicles.

**26.** (1) The Authority in consultation with the agency responsible for motor vehicle inspection may at any time order the inspection of a vehicle releasing visible exhaust emissions.

(2) in performing its functions under subregulation (1), the

Authority shall ensure that-

(a) all commercial and public service vehicles undergo emission tests annually; and

(b) all private vehicles over five years old undergo emission tests once in every two years;

(3) The emission tests referred to in subregulation (2) shall be carried out by the relevant agency responsible for the motor vehicle inspection or accredited emission vehicle testing centers.

Emission reduction measures.

**27.** In order to meet the emission standards stipulated by the Bureau, the owner or operator of a mobile emission source may use any of the emission reduction measures specified under the Twelfth Schedule or any other technology acceptable to the Authority.

Dispersion of particulate matter.

**28.** No person shall cause or allow the dispersion of visible particulate matter from any material being transported by motor vehicle or by other mode of transportation.

## **PART VII - OCCUPATIONAL AIR QUALITY LIMITS**

Occupational exposure of air pollutants.

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**29.** (1) The occupier or operator of premises shall ensure that exposure of indoor air pollutants does not exceed the exposure limits stipulated under the Factories and Other Places of Work (Hazardous Substances) Rules or under any other relevant law.

(2) Where the hazardous substances referred to in subregulation (1) are not covered under the legislation referred to therein, the occupier or operator shall apply the guidelines provided by the manufacturer or supplier of the substances.

Variation of exposure levels.

**30.** The Authority, in consultation with the relevant lead agencies may-

(a) prescribe exposure limits of air pollutants and emission levels of hazardous substances;

- (b) prohibit the use of substances which pollute the working environment; or
- (c) specify particular measures of prevention of pollution or protection of workers.

Exposure to hazardous substances.

**31. An owner or occupier of a controlled facility shall-**

- (a) inform the workers of the hazards in specific work environments;
- (b) train the workers on the potential hazards of any hazardous substance to which they are exposed and the safety precautions to be taken to prevent any harm to their health;
- (c) ensure that measurements of pollutants are carried out by a laboratory designated by the Authority in order to determine compliance with the prevailing allowed levels of exposure;
- (d) ensure that record of measurements carried out under paragraph (c) are reported to the Authority on a quarterly basis.
- (e) Take exposure reduction measures recommended under Part IX of the Fifth Schedule.

**PART VIII - OTHER SOURCES**

Particulates from material handling.

**32.** No person operating construction equipment or handling construction material shall allow emission of particulate matter so as to adversely affect the limits set out in the First schedule.

Particulates from demolitions.

**33.** No person shall cause or allow emission of particulate matter during the demolition of structures, buildings, or parts of buildings in such a manner as to adversely affect the limits set out in the First

Schedule.

Effect of Stockpiling material.

**34.** No person shall cause or allow stockpiling or other storage of material in a manner likely to cause ambient air quality levels to be destroyed.

Emissions from waste incinerators.

**35.** No person, operator or owner of any waste incinerator shall allow or cause emission of air pollutants set out under the Second Schedule in excess of the appropriate mass emission rates indicated in the Third Schedule.

Nox Emissions.

**36.** (1) No owner or operator of fuel burning equipment shall cause or allow emissions of oxides of nitrogen in excess of those stipulated in the Third Schedule.

(2) The owner or operator of a facility whose fuel burning equipment causes emission of nitrogen oxides in excess of the limits specified under the Third Schedule shall institute remedial measures recommended under the Part X of the Fifth Schedule.

Open Burning.

**37.** No person shall cause or allow emissions of priority air pollutants set out under the Second Schedule from disposal of medical waste, domestic waste, plastics, tyres, industrial waste or other waste by open burning.

Cross-Border Air Pollution.

**38.** (1) Every owner or operator of a controlled facility shall ensure that emissions from his facility does not cause air pollution in any territory outside the jurisdiction of Kenya in excess of the relevant ambient air quality levels prescribed both in Kenya and in the territory outside the jurisdiction of Kenya.

(2) No person shall cause pollution of the ambient air in controlled areas to exceed the limits stipulated in the First Schedule.

## **PART IX - LICENCES**

Application for an emission Licence.

**39.** The owner or operator of any controlled facility shall apply to the Authority for an emission licence within twelve months from the

date these regulations come into force.

Application  
procedure.

**40.** (1) An owner or operator of a controlled facility shall apply for a provisional emission licence by submitting to the Authority, an application as set out in Form I, of the Ninth Schedule.

(2) An application shall be considered complete when the following requirements are satisfied-

(a) the application form is complete in respect of all the information required of the applicant, including any necessary supporting data and calculations;

(b) the licence application is accompanied by a compliance plan that indicates the proposed activities and the schedule for bringing the facility into compliance where –

(i) the expected emissions from any source or activity in the application are likely to exceed any applicable emission standard or target;

(ii) any expected emissions from the facility are based on dispersion modeling, are found to be likely to exceed any ambient air quality standard; or

(iii) any expected ambient air quality measurements at required monitoring locations exceeds a prescribed air quality standard;

(c) an authorized official of the applicant certifies the truth, accuracy, and completeness of the application, as provided in the application form; and

(d) the application form is accompanied by proof of payment of the prescribed licence application fee and prescribed emission licence fee.

(3) Where the Authority considers that the application is complete it shall issue the applicant with a provisional licence in Form III set out in the Ninth Schedule within a period of ninety days from the date of receipt of the application.

(4) Where the Authority considers that an application under this regulation is incomplete, it shall notify the applicant accordingly within a period of sixty days of the receipt of the application.

(5) A notification under sub-regulation 4 shall be in writing and shall specify the information needed to make the application complete and prescribe a reasonable time frame for response from the applicant.

(6) Where, while processing an application that is found to be complete, the Authority determines that additional information is necessary to evaluate or take final action on that application, the Authority may in writing request for such information and set a reasonable deadline for response.

(7) Once the Authority determines that an application is complete, the Authority shall notify the applicant accordingly and such notification shall constitute a provisional emission licence, which shall remain in effect until the Authority notifies the applicant in writing that the application is approved or refused.

Emission licence.

**41.(1)** The holder of a provisional licence shall ensure that his facility undergoes monitoring by the Authority at agreed intervals, and may, with the approval of the Authority, apply for an emission licence in Form IV set out in the Ninth Schedule.

Emission licence form.

(2) An emission licence, shall be in Form V set out in the Ninth Schedule, and shall be valid for a period of one year beginning on the date of the approval of the application for the licence, and may be renewed, on application, for successive period of one year.

(3) An emission shall be subject to such terms and conditions as the Authority may deem necessary.

Requirements for applications.

**42.** An application for an emission licence shall be accompanied by-

- (a) the prescribed fee as set out in the Thirteenth Schedule; and
- (b) such other information as the Authority may from time to time specify.

Licence processing period.

**43.** (1) The Authority shall reach a decision in respect of a licence application within ninety days after receipt and shall-

- (a) notify the applicant of the decision, and give written reasons if the application was unsuccessful;
- (b) notify any person who may have complained of the proposed activity,
- (c) at the request of any person contemplated in paragraph (b), give written reasons for its decision or make public its reasons;

(2) Where an application has been rejected under subregulation (1) the applicant shall reapply in a similar manner to the initial application.

Renewal of emission licence.

**44.** (1) The holder of an emission licence shall apply forty-five days before the expiry date of the licence to the Authority for the renewal of the licence by submitting an application in Form VI set out under the Ninth Schedule.

(2) An application for the renewal of a licence shall be accompanied by-

- (a) the prescribed application fee stipulated under the

Thirteenth Schedule, and

(b) such other information as may be required by the Authority.

(3) The Authority shall, at the time of considering an application for renewal, decide on the continuation or otherwise of-

- (a) ambient air monitoring,
- (b) meteorological monitoring or,
- (c) source testing,

or any other condition specified in the licence.

(4) The applicants shall, for the purposes of subregulation (4) demonstrate-

- (a) the adequacy of existing data;
- (b) its relationship to past, present and future facility operating conditions; and
- (c) the adequacy of other means to document continuing compliance.

Transfer of  
Emission Licence.

**45.** (1) Where the holder of an emission licence wishes to transfer the license to another person the transferee and transferor shall jointly apply to the Director- General for approval of the transfer in Form VII set out under the Ninth Schedule at least ninety days prior to any such change;

(2) The Director-General shall consider an application under subregulation (1) before the expiry of the period specified under subregulation (1) and may grant the approval or decline with reasons in writing forwarded to the applicant.

(3) Where the Director-General grants his approval, the transfer shall be effective upon payment of a transfer fee prescribed under the Thirteenth Schedule,

(4) A licence transferred under sub-regulation (3) shall be only in respect of the facility for which licence was issued.

(5) A person to whom a licence is transferred shall be issued with a Certificate of Transfer in Form VIII set out in the Ninth Schedule.

(6) The transferor of a licence under these regulations shall be liable for all liabilities prior to the date of transfer.

Liability of transferee

**46.** (1) The transferee shall be responsible for any future liabilities or any obligations imposed with regard to the licence from the date the transfer become effective.

(2) Notwithstanding sub-regulation (1) the holder of an emission licence may apply to the Authority for the variation of the licence.

(3) An application under subregulation (2) shall be in Form IX set out in the Ninth Schedule and shall be accompanied by the prescribed fee.

(4) Upon receipt of an application for variation of an emission licence the Authority in consultation with the relevant lead agencies shall consider the application within forty-five days, and where the application is approved, shall issue a certificate of variation in Form X set out in the Ninth Schedule.

Variation of emission licence by Authority.

**47.** The Authority may, in consultation with the relevant lead agencies vary an emission licence where it deems it necessary and inform the holder accordingly in writing, giving reasons for the necessary variation.

Compliance Plan.

**48.** (1) As part of the requirements of a control order or of an application for the grant or renewal of a licence, the Authority may

require the completion of a compliance plan in accordance with this regulation.

(2) A compliance plan shall include the elements stipulated in Part XI of the Fifth Schedule

Suspension,  
Revocation or  
Cancellation of  
Emission Licence.

**49.** (1) The Authority may, after issuing an emission licence under these Regulations, at any time -

- (a) suspend the licence on such terms and conditions as it may deem fit; or
- (b) revoke or cancel the licence.

(2) A licence shall be suspended, revoked or canceled under sub-regulation (1) where-

- (a) the licence holder contravenes the conditions set out in the licence,
- (b) there is substantial change or modification in the activities in respect of which it was issued;
- (c) the emission poses a health or environmental threat which could not be reasonably foreseen before the licence was issued, or
- (d) it is established that the information or data given by the licence holder in support of his application for an emission licence was false, incorrect or intended to mislead;
- (e) the licence holder fails to obey a control order issued under these regulations;
- (f) the licence holder fails to submit and comply with a fugitive particulate emissions control plan or a compliance plan as required under these regulations.

Register of  
Emission Licences.

**50.** (1) The Authority shall maintain:-

- (a) a register of emission licences as set out in Form XI under the Ninth Schedule, and
- (b) monitoring reports which shall be public documents maintained at the offices of the Authority for inspection by any person on payment of the fees specified under the Thirteenth Schedule.

Appeal.

**51.** Any person who is aggrieved by the decision of the Authority pursuant to the exercise of its powers under this Part may appeal in the manner provided in the Act.

## **PART X - METHODS OF MEASUREMENT, AND ANALYSIS**

Measurement of  
air pollutants.

**52.**(1) Any person, owner or operator of a facility listed under the Fourth Schedule shall ensure that measurement of emissions and occupational exposure levels are carried out in accordance with the methods of test set out in the Eleventh Schedule.

(2) The analysis of all measurements in sub-regulation (1) above shall be carried out by laboratories designated by the Authority.

Measurement of  
Ambient Air  
Quality.

**53.** The Authority in consultation with the relevant lead agencies may carry out all measurements of Ambient Air Quality levels in accordance with the methods of test set out in the Eleventh Schedule.

Visible air  
pollutants.

**54.** Measurements of visible air pollutants shall be in accordance with the relevant method of measurement set out under the Eleventh Schedule or in accordance with any method approved by the Authority.

Measuring  
vehicular  
emissions.

**55.**(1) The procedure for measuring vehicular emissions shall be in accordance with the relevant methods of test and analysis stipulated under the Eleventh Schedule or any other method approved by the Authority.

Period for storing records.

**56.**(1) The record of the measurements carried out as required under regulation 52 shall be kept by the owner, occupier, or operator of the facility for a period of two years or such other period as may be prescribed by the Authority.

(2) All emission test reports shall be delivered to the Authority within ninety days from the date of completion of the testing.

(3) The Authority may, if it thinks fit, grant an extension of the period specified in sub-regulation (2) upon the submission to the Authority, not less than five days before the expiration of such period, of a written explanation for the requested extension.

(4) The records of these results shall be submitted to the Authority within thirty days after analysis.

Obnoxious smells.

**57.**(1) An owner or operator of a controlled facility shall measure the level of obnoxious smells by use of measuring equipment set out under the Eleventh Schedule, or alternatively may cause such levels to be assessed by an odour panel established by the Authority.

## **PART XI - INSPECTION AND MONITORING**

Monitoring of Ambient Air Quality .

**58.** The Authority may carry out monitoring of ambient air quality or request a relevant lead agency to do so on its behalf.

Assessment of Air Quality .

**59.** The Authority may in consultation with the relevant lead agencies assess the air quality in accordance with the guidelines set out in Part XII of the Fifth Schedule.

Preliminary assessment of stationary sources.

**60.**(1) Pursuant to these Regulations, preliminary assessment of stationary sources of air pollutants shall be carried out by the Authority in consultation with lead agencies within controlled areas following the relevant guidelines.

(2) For each controlled facility, the assessment for air pollutants shall include, as minimum, the parameters indicated under the Fourth Schedule or any other parameter determined by the Authority.

Provision of Portholes in Stacks.

**61.** The owner or operator of a controlled facility shall provide portholes, and platforms which shall be conveniently located for easy access and all other facilities required for taking samples of air or emission from any chimney, flue or duct, plant or vessel or any other outlets.

Provision of service for stack sampling.

**62.** Where the Authority requires stack emission tests to be performed under these Regulations, the owner of the facility shall provide the following-

- (a) sampling ports which are adequate for the test methods applicable to the facility;
- (b) safe sampling platforms or other suitable and safe permanent or temporary structures or equipment,
- (c) safe access to sampling platforms.

Stack emission recording and reporting requirements.

**63.** (1) Results of emissions sampling and analysis shall be prescribed in the format set out in Part XIII of the Fifth Schedule and expressed in metric units consistent with the emission standards or targets set out in these Regulations or in the conditions, if any, imposed in the relevant licence.

Continuous Monitoring System requirements.

**64.** (1) A holder of a licence who has any of the sources of emission set out in the Third Schedule shall install, calibrate, maintain and operate equipment for continuously monitoring and recording emission levels in accordance with these Regulations, or equivalent emission measuring systems as may be approved by the Authority.

(2) An owner or operator of a facility existing before the coming into force of these Regulations shall install equipment as required under sub-regulation (1) within a period of twenty-four months after the coming into force thereof.

Air quality monitoring records.

**65.** (1) The owner or operator of a controlled facility shall maintain air quality monitoring records for sources of air pollution in the manner prescribed by the Authority.

(2) The monitoring records shall be in the prescribed form as outlined in the Eighth Schedule.

(3) The records referred to in subregulation (1) shall be preserved by the holder of a licence for a period of two years or such longer period as may be prescribed by the Authority.

## **PART XII - REPORTING**

Initial emission assessment report.

**66.** The owner and operator of any stationary source which is subject to regulation 14(1), shall, not later than one year from the date of these regulations come into operation-

(a) submit an initial emission assessment report in accordance with the guidelines set out in Part XII of the Fifth Schedule;

(b) notify the Authority of their applicability status;

(c) submit an emission assessment report as to what constitutes best available technology for the source, including technical and economic support documentation; and

(d) provide a detailed schedule, acceptable to the Authority, for implementing the best available technology program.

Atmospheric impact report.

**67.** (1) The Authority may require an operator, owner or occupier to submit an atmospheric impact report in accordance with the guidelines set out in Part XII of the Fifth Schedule.

(2) All emission test reports shall be delivered to the Authority within ninety days from the date of completion of testing.

Monitoring records.

**68.**(1) The owner or operator of any facility listed in the Fourteenth Schedule shall submit the monitoring records to the Authority on a quarterly basis.

(2) The Authority shall convey its written comments on the records to the applicant within thirty days of the receipt thereof.

(3) An owner or operator of a controlled facility, equipment, or air pollution control device which emits or causes to be emitted any air pollutant shall submit to the Authority any relevant information that the Authority may request in writing within sixty (60) calendar days or any other period determined by the Authority.

(4) An owner or operator of a controlled facility shall complete the installation and performance tests of the above equipment and begin monitoring and recording before issuance of an emission license.

Notification of excessive emissions.

**69.**(1) The owner or operator of any facility where the air pollution control system breaks down or malfunctions, and is likely to cause excessive emissions leading to imminent danger, shall notify the Authority within a period of twenty-four hours from the date of the occurrence.

(2) The owner or operator of any controlled facility to which sub regulation (1) applies shall submit to the Authority a report in the Form II set out in the Ninth Schedule regarding the occurrence.

### **PART XIII- MISCELLANEOUS**

Guideline for monitoring air pollutants.

**70.** The Authority may in consultation with the lead agencies may issue guidelines, including guidelines listed under Part XIII of the Fifth Schedule to these regulations, on the monitoring of air pollutants.

Greenhouse gases.

**71.** An owner or operator may adapt or install air pollution control technologies for mitigation of green house gases in accordance with the guidelines set out in Part X of the Fifth Schedule.

Dioxins and furans.

**72.** An owner or operator may retrofit his production processes with air pollution control technologies specified under the Seventh Schedule in order to reduce emission of dioxins and furans to limits specified under the Third Schedule.

Emission rate for oxides of nitrogen.

**73.** The maximum emission rate for oxides of nitrogen from stationary internal combustion engines shall not exceed those achieved using best available technology specified under the Part X the Fifth Schedule, or any other technology approved by the Authority.

Notification of permissible levels.

**74.** (1) The Minister shall upon the coming into operation of these Regulations, issue a notice in respect of facilities listed in the Fourteenth Schedule to-

(a) prescribe maximum emission standards in respect of a substance or mixture of substances resulting from a listed activity and identified in the notice including-

(i) the permissible amount or concentration of that substance or mixture or,

(ii) the manner in which the measurement of such emissions shall be carried out; and

(b) prescribe transitional and other special arrangements in respect of existing activities.

Baseline Levels of Priority Air Pollutant.

**75.** The Authority may in consultation with the relevant lead agencies establish baseline levels of priority air pollutants set out in the Second Schedule.

Offences & Penalties.

**76.** A person who fails to comply with the provisions of these Regulations, commits an offence and is liable on conviction to

imprisonment for such term and such fine as provided for in the Act.

Charges for  
pollution.

**77.** Where the Authority demonstrates that a person is not complying with any of the standards set out in these Regulations, the Authority may charge such person a penalty of ten thousand Kenya shillings for every parameter not being complied with, per day, until such person demonstrates full compliance with the relevant standard related to such parameter.

Revocation of LN  
131/2006

**78.** The Environmental Management and Co-ordination (Fossil Fuels) Regulations, 2006, are revoked.

Transitional  
Provision.

**79.** Notwithstanding Regulation 78 any person carrying out any activities prescribed in these Regulations immediately before the coming into operation of these Regulations shall, subject to Regulation 64(2), within twelve months from the coming into force thereof, take all necessary measures to ensure full compliance with these Regulations.

**FIRST SCHEDULE**  
**AMBIENT AIR QUALITY TOLERANCE LIMITS**

**Table 1: Ambient Air Quality Tolerance Limits**

	Pollutant	Time weighted Average			
			Industrial area	Residential, Rural & Other area	Controlled areas***
1.	Sulphur oxides (SO <sub>x</sub> );	Annual Average*	80 µg/m <sup>3</sup>	60 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>
		24 hours**	125 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>	30 µg/m <sup>3</sup>
		Annual Average		0.019 ppm/50µg/m <sup>3</sup>	
		Month Average			
		24 Hours		0.048ppm /125µg/m <sup>3</sup>	
		One Hour			
		Instant Peak		500 µg/m <sup>3</sup>	
		Instant Peak (10 min)		0.191 ppm	
2.	Oxides of Nitrogen (NO <sub>x</sub> );	Annual Average*	80 µg/m <sup>3</sup>	60 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>
		24 hours**	150 µg/m <sup>3</sup>	80 µg/m <sup>3</sup>	30 µg/m <sup>3</sup>
		8 hours			
		Annual Average		0.2 ppm	
		Month Average		0.3 ppm	
		24 Hours		0.4 ppm	
		One Hour		0.8 ppm	
		Instant Peak		1.4 ppm	
3.	Nitrogen Dioxide	Annual Average	150 µg/m <sup>3</sup>	0.05 ppm	
		Month Average		0.08 ppm	
		24 Hours	100 µg/m <sup>3</sup>	0.1 ppm	
		One Hour		0.2 ppm	
		Instant Peak		0.5 ppm	
4.	Suspended particulate	Annual Average*	360 µg/m <sup>3</sup>	140 µg/m <sup>3</sup>	70 µg/m <sup>3</sup>

	<b>Pollutant</b>	<b>Time weighted Average</b>			
	matter (SPM)				
		24 hours**	500 µg/m <sup>3</sup>	200 µg/m <sup>3</sup>	100 µg/m <sup>3</sup>
			<b>Industrial area</b>	<b>Residential, Rural &amp; Other area</b>	<b>Controlled areas***</b>
		mg/Kg			
		Annual Average*****		100 µg/m <sup>3</sup>	
		24 hours***		180 µg/m <sup>3</sup>	
5.	Respirable particulate matter (<10µm) (RPM)	Annual Average*	70 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>
		24 hours**	150 µg/Nm <sup>3</sup>	100 µg/Nm <sup>3</sup>	75 µg/Nm <sup>3</sup>
6.	PM <sub>2.5</sub>	Annual Average	35 µg/m <sup>3</sup>		
		24 hours	75 µg/m <sup>3</sup>		
7.	Lead (Pb)	Annual Average*	1.0 µg/Nm <sup>3</sup>	0.75 µg/Nm <sup>3</sup>	0.50 µg/m <sup>3</sup>
		24 hours**	1.5 µg/m <sup>3</sup>	1.00 µg/m <sup>3</sup>	0.75 µg/m <sup>3</sup>
		Month Average		2.5	
8.	Carbon monoxide (CO)/ carbon dioxide (CO <sub>2</sub> )	8 hours**	5.0 mg/m <sup>3</sup>	2.0 mg/m <sup>3</sup>	1.0 mg/m <sup>3</sup>
		1 hour	10.0 mg/m <sup>3</sup>	4.0 mg/m <sup>3</sup>	2.0 mg/m <sup>3</sup>
		mg/Kg			
		24 hours**			
9.	Hydrogen Sulphide	24 hours**	150µg/m <sup>3</sup>		
10.	Non-methane hydrocarbons				
		instant Peak	700ppb		
11.	Total VOC	24 hours**	600 µg/m <sup>3</sup>		
12.	Ozone	1-Hour	200 µg/m <sup>3</sup>	0.12 ppm	
		8 hour (instant Peak)	120 µg/m <sup>3</sup>	1.25 ppm	

And any other parameter as may be prescribed by the Authority from time to time

**Legend**

a)  $\mu\text{g}$ - *microgram*

b)  $\text{m}^3$  – *cubic metre*

c) *ppm – parts per million*

d) *ppb – parts per billion*

e) Values at Standard Temperature and Pressure (STP)

f) Conversion factors from ppm to  $\text{mg}/\text{m}^3$  and  $\text{mg}/\text{m}^3$  to ppm are stipulated under the Eleventh Schedule

g) \* [Annual Arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval. ]

h) [\*\* 24 hourly/8 hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed but not on two consecutive days. ]

i) Whenever and wherever two consecutive values exceeds the limit specified above for the respective category, it would be considered adequate reason to institute regular/continuous monitoring and further investigations.

j) \* the 24-hour limit may not be exceeded more than three times in one year;

k) \*\* 24-hour limit may not be exceeded more than three times in one year micrograms/ $\text{m}^3$

l) \*\*\* Not to be exceeded more than once per year average concentration

m)\*\*\*In conversion of units from ppm to  $\text{mg}/\text{m}^3$  and vice versa shall use guidelines set out under Part II of the Fifth Schedule.

**b) Table 2: Ambient Air Quality at Property Boundary for General Pollutants**

	<b>Pollutant</b>	<b>Time weighted Average</b>	<b>Property Boundary</b>
1	Particulate matter (PM)	Annual Average*	50 $\mu\text{g}/\text{m}^3$
		24 hours**	70 $\mu\text{g}/\text{m}^3$
2.	Oxides of Nitrogen ( $\text{NO}_x$ );	Annual Average*	80 $\mu\text{g}/\text{m}^3$
		24 hours**	150 $\mu\text{g}/\text{m}^3$
3.	Sulphur oxides ( $\text{SO}_x$ );	Annual Average*	50 $\mu\text{g}/\text{m}^3$
		24 hours**	125 $\mu\text{g}/\text{m}^3$
4.	Hydrogen Sulphide	24 hours**	50 $\mu\text{g}/\text{m}^3$
5.	Ammonia	24 hours**	100 $\mu\text{g}/\text{m}^3$

**Note.**

- a) For residential premises in designated industrial areas, the above standards do not apply.
- b) For industries in designated residential areas, standards for residential areas shall apply.

## SECOND SCHEDULE

### PRIORITY AIR POLLUTANTS

*Part I: General Source Pollutants*

- a) Particulate matter (Dust, black smoke, smog, aerosols);
- b) Sulphur oxides (SO<sub>x</sub>);
- c) Nitrogen oxides (NO<sub>x</sub>);
- d) Carbon monoxide (CO)
- e) Carbon dioxide (CO<sub>2</sub>);
- f) Hydrocarbons (HC);
- g) Volatile organic Compounds(VOC);
- h) Hydrogen Sulphide (H<sub>2</sub>S);
- i) Hydrogen Chloride (HCl);
- j) Lead and its compounds;
- k) Mercury vapour (Hg)
- l) Ozone (O<sub>3</sub>);
- m) Dioxins and furans (PCDD and PCDF).

*Part II: Mobile Source Pollutants*

- a) Hydrocarbons (HCs)
- b) Volatile organic Compounds(VOC);
- c) Sulphur dioxide (SO<sub>x</sub>)
- d) Nitrogen oxides (NO<sub>x</sub>)
- e) Particulates (PM)
- f) Carbon Monoxide (CO)

*Part III: Greenhouse gases(GHG)*

- a) Carbon dioxide (CO<sub>2</sub>);
- b) Methane (CH<sub>4</sub>);
- c) Nitrous oxides (N<sub>2</sub>O);
- d) Hydrofluorocarbons (HCFCs);
- e) Perfluorocarbons (PFCs); and
- f) Sulphur hexafluoride (SF<sub>6</sub>);

## THIRD SCHEDULE

## EMISSION LIMITS FOR CONTROLLED AND NON-CONTROLLED FACILITIES

Industry	Air Pollutant	Opacity	Particulate (Dust) PM <sub>10</sub> (mg/Nm <sup>3</sup> )	Sulphur oxide (SO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Nitrogen oxides (NO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Carbon monoxide (mg/Nm <sup>3</sup> )	Carbon dioxide (mg/Nm <sup>3</sup> )	Hydrocarbons (mg/Nm <sup>3</sup> )	Hydrogen Sulphide (mg/Nm <sup>3</sup> )	Hydrogen Chloride (mg/Nm <sup>3</sup> )	Hydrogen Fluoride (mg/Nm <sup>3</sup> )	Dioxins/Furans
Aluminium recycling plants			10 – 30					20		*		*
Asphalt mixing batch plants			< 100 t: g/kg	2000	460	*	*	20				
			100 to 300 t: 22g/kg									
			300 to 500 t: 31g/kg									
			> 500 t: 33 g/kg									
Boilers		*	50	*	*	*	*	*				*
Cement plants			50	400	1500	*	500	300				0.5ng/N m <sup>3</sup>
Ceramics manufacture			400		180- 250 ppm							
Coke & coal plants			*	*	*	*	*	*	*	*		
Dairy			50									
Fertilizer plant			50	*	500			20	30		50	

Industry	Air Pollutant	Opacity	Particulate (Dust) PM <sub>10</sub> (mg/Nm <sup>3</sup> )	Sulphur oxide (SO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Nitrogen oxides (NO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Carbon monoxide (mg/Nm <sup>3</sup> )	Carbon dioxide (mg/Nm <sup>3</sup> )	Hydrocarbons (mg/Nm <sup>3</sup> )	Hydrogen Sulphide (mg/Nm <sup>3</sup> )	Hydrogen Chloride (mg/Nm <sup>3</sup> )	Hydrogen Fluoride (mg/Nm <sup>3</sup> )	Dioxins/Furans
Iron Foundry			50	560		*	*				5	
Brass bronze Foundry			50	20 - 50								
Glass Manufacture			20 - 50	Oil fired: 1,800 - 2000						50	5	
				Gas fired: 700								
Galvanizing operations		*	50									
Incinerators		*	< 10 t: 4g/kg 10 to 30 t: 10g/kg 30 to 50 t: 10g/kg > 50 t: 17.5 g/kg	500	Exist ing:1 30- 600 ppm	*		*				2.0 – 80 ng TEQ/N m <sup>3</sup>

Industry	Air Pollutant		Opacity	Particulate (Dust) PM <sub>10</sub> (mg/Nm <sup>3</sup> )	Sulphur oxide (SO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Nitrogen oxides (NO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Carbon monoxide (mg/Nm <sup>3</sup> )	Carbon dioxide (mg/Nm <sup>3</sup> )	Hydrocarbons (mg/Nm <sup>3</sup> )	Hydrogen Sulphide (mg/Nm <sup>3</sup> )	Hydrogen Chloride (mg/Nm <sup>3</sup> )	Hydrogen Fluoride (mg/Nm <sup>3</sup> )	Dioxins/Furans
						New : 60- 400 ppm							0.1 – 5 ng TEQ/N m <sup>3</sup>
		Municipal waste		100		300	*	*					
		Medical waste		20 (PM <sub>2.5</sub> )	500	300	*	*	*		*		*
		Industrial waste	*	50	150	460	*	*	*	*	*		*
	Kraft pulp mills			100-150	500	600	*	*	20	15	*	*	*
	Lead Recycling plants			20 (PM <sub>2.5</sub> )	400								*
	Mineral Processing			50									
	Mining & Quarry		20%	400									
	Non-ferrous	secondary		50	20	*	*	*	*	*			
	Non-ferrous	secondary	*	< 10 t: 7.5 g/kg (PM <sub>2.5</sub> ) 10 to 30 t: 22.5 g/kg (PM <sub>2.5</sub> )	800	*	*	*	20	15			*

Industry	Air Pollutant	Opacity	Particulate (Dust) PM <sub>10</sub> (mg/Nm <sup>3</sup> )	Sulphur oxide (SO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Nitrogen oxides (NO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Carbon monoxide (mg/Nm <sup>3</sup> )	Carbon dioxide (mg/Nm <sup>3</sup> )	Hydrocarbons (mg/Nm <sup>3</sup> )	Hydrogen Sulphide (mg/Nm <sup>3</sup> )	Hydrogen Chloride (mg/Nm <sup>3</sup> )	Hydrogen Fluoride (mg/Nm <sup>3</sup> )	Dioxins/Furans
			30 to 50 t: 37.5g/kg (PM <sub>2.5</sub> ) > 50 t: 52.5 g/kg (PM <sub>2.5</sub> )									
	Paint and varnish manufacturing		50 (PM <sub>2.5</sub> )					20	15	10		
	Pesticides formulation		20 (PM <sub>2.5</sub> )					20		5		
	Pesticide manufacturing		20					20				
	Petroleum Refineries		50	Sulphur recovery: 150 Combustion units: 500	460	*		20	152			*
	Pharmaceuticals manufacturing plants		20					80		10		
	Printing industry							20		10		

	Air Pollutant Industry	Opacity	Particulate (Dust) PM <sub>10</sub> (mg/Nm <sup>3</sup> )	Sulphur oxide (SO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Nitrogen oxides (NO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Carbon monoxide (mg/Nm <sup>3</sup> )	Carbon dioxide (mg/Nm <sup>3</sup> )	Hydrocarbons (mg/Nm <sup>3</sup> )	Hydrogen Sulphide (mg/Nm <sup>3</sup> )	Hydrogen Chloride (mg/Nm <sup>3</sup> )	Hydrogen Fluoride (mg/Nm <sup>3</sup> )	Dioxins/Furans
	Steel mills	*	Existing-240 (PM <sub>2.5</sub> )	500	200	*						
			New-120 (PM <sub>2.5</sub> )		180							
	Sulphuric acid Plants		50	SO <sub>2</sub> : 2 kg/t acid								
				< 100 t: 3.75 g/kg								
				100 to 300 t: 10.5 g/kg								

Industry	Air Pollutant	Opacity	Particulate (Dust) PM <sub>10</sub> (mg/Nm <sup>3</sup> )	Sulphur oxide (SO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Nitrogen oxides (NO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Carbon monoxide (mg/Nm <sup>3</sup> )	Carbon dioxide (mg/Nm <sup>3</sup> )	Hydrocarbons (mg/Nm <sup>3</sup> )	Hydrogen Sulphide (mg/Nm <sup>3</sup> )	Hydrogen Chloride (mg/Nm <sup>3</sup> )	Hydrogen Fluoride (mg/Nm <sup>3</sup> )	Dioxins/Furans
				300 to 500 t: 34.5g /kg > 500 t: 48 g/kg								
Sugar Manufacture	(< 8.7 mw input boiler): 150		2000	Liqu id fuels : 460 ppm Solid fuels : 750 ppm								
	(>8.7 mw input boiler): 100											
Soda ash Manufacture	50									*		
Tanneries	50		1000	1500			20	15	*			*
Textiles	50						20					
Geothermal Power plants				*	*				*			

	Air Pollutant Industry	Opacity	Particulate (Dust) PM <sub>10</sub> (mg/Nm <sup>3</sup> )	Sulphur oxide (SO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Nitrogen oxides (NO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Carbon monoxide (mg/Nm <sup>3</sup> )	Carbon dioxide (mg/Nm <sup>3</sup> )	Hydrocarbons (mg/Nm <sup>3</sup> )	Hydrogen Sulphide (mg/Nm <sup>3</sup> )	Hydrogen Chloride (mg/Nm <sup>3</sup> )	Hydrogen Fluoride (mg/Nm <sup>3</sup> )	Dioxins/Furans
	Thermal Power Plants		Coal:-50	(50-100 MWt h): 850	750	*	*	*	*			*
(100 to 300 MWt h): 200												
(> 300 MWt h): 200												
Oil:- 50	(50-100 MWt h): 850	460										

	Industry / Air Pollutant	Opacity	Particulate (Dust) PM <sub>10</sub> (mg/Nm <sup>3</sup> )	Sulphur oxide (SO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Nitrogen oxides (NO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Carbon monoxide (mg/Nm <sup>3</sup> )	Carbon dioxide (mg/Nm <sup>3</sup> )	Hydrocarbons (mg/Nm <sup>3</sup> )	Hydrogen Sulphide (mg/Nm <sup>3</sup> )	Hydrogen Chloride (mg/Nm <sup>3</sup> )	Hydrogen Fluoride (mg/Nm <sup>3</sup> )	Dioxins/Furans
				(100 to 300 MWt h): 400 to 200; linear decrease								
			Gas:- 50	(> 300 MWt h): 200	<b>120</b>							

	Air Pollutant Industry	Opacity	Particulate (Dust) PM <sub>10</sub> (mg/Nm <sup>3</sup> )	Sulphur oxide (SO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Nitrogen oxides (NO <sub>x</sub> ) (mg/Nm <sup>3</sup> )	Carbon monoxide (mg/Nm <sup>3</sup> )	Carbon dioxide (mg/Nm <sup>3</sup> )	Hydrocarbons (mg/Nm <sup>3</sup> )	Hydrogen Sulphide (mg/Nm <sup>3</sup> )	Hydrogen Chloride (mg/Nm <sup>3</sup> )	Hydrogen Fluoride (mg/Nm <sup>3</sup> )	Dioxins/Furans
				(100 to 300 MWt h): 35								
	Waste water treatment plants			(> 300 MWt h): 35	NH <sub>3</sub> (100-400)			400-2,000	50-200			

And any other parameter as may be prescribed by the Authority from time to time

The chimney or stack should have a minimum height of 10 metres above ground level and clear the highest of the building by not less than 3 metres for all roofs. The topography and height of adjacent buildings within 50 metres radius should be taken into account.

### Legend

Toxic Equivalent (TEQ) is the sum of the toxic equivalent factors (TEF) of a mixture congeners contained in a compound. The compound 2,3,7,8-tetrachlorodibenzo-p-dioxin(TCDD) was assigned a TEF of 1 after being identified, by International Association of Radiology and Cancer (IARC) and World Health Organisation (WHO), as the most toxic of all compounds, and as carcinogenic to humans, based mainly on studies of cases involving accidental or occupational heavy exposure. Therefore the TEF is a weighting factor.

*g - gram*

*μg- microgram*

*kg – kilogram (1,000g)*

*mg - milligram*

*μg- microgram*

*m<sup>3</sup> – cubic metre*

*ppm – parts per million*

*t – tonne*

## FOURTH SCHEDULE

## GUIDELINE ON AIR POLLUTION MONITORING PARAMETERS FROM STATIONARY SOURCES

Industry Air Pollutant	Opacity	Particulate (Dust)	Sulphur oxide (SO <sub>x</sub> )	Nitrogen oxides (NO <sub>x</sub> )	Carbon monoxide	Carbon dioxide	Hydrocarbons	Hydrogen Sulphide (H <sub>2</sub> S)	Hydrogen Chloride	Dioxins/Furan s
Aluminium recycling plants		*					*		*	*
Asphalt batch plants		*	*	*	*	*	*			
Boilers	*	*	*	*	*	*	*			*
Cement plants		*	*		*	*	*			*
Ceramics manufacturing plants		*		*						
Coke & coal plants		*	*	*	*	*	*	*	*	
Fertilizer plant		*	*	*			*	*		*
Galvanizing plants		*			*	*				
Glass manufacturing plants		*	*	*					*	*
Iron Foundry plant		*	*		*	*				*
Kraft pulp mills		*	*	*	*	*	*	*	*	*
Lead Recycling plant		*	*							*
Mineral Processing plants		*								
Mining & Quarry	*	*								
Municipal and Industrial incinerators	*	*	*	*	*	*	*		*	*
Non-ferrous smelters, secondary	*	*	*	*	*	*	*	*		*
Paint and varnish		*					*	*	*	

Industry Air Pollutant	Opacity	Particulate (Dust)	Sulphur oxide (SO <sub>x</sub> )	Nitrogen oxides (NO <sub>x</sub> )	Carbon monoxide	Carbon dioxide	Hydrocarbons	Hydrogen Sulphide (H <sub>2</sub> S)	Hydrogen Chloride	Dioxins/Furan s
manufacturing										
Pesticides formulation		*					*		*	
Pesticide Manufacturing plants		*					*			
Petroleum Refineries			*		*		*			*
Pharmaceuticals manufacturing plants		*					*		*	
Printing industry							*		*	
Steel mills	*	*	*	*	*					
Sugar manufacturing plants		*	*	*						
Sulphuric acid Plants		*	*							
Salt & Soda ash processing plants		*							*	
Thermal Power Plants		*	*	*	*	*				*
Geothermal Power Plants			*	*			*	*		
Tanneries		*	*	*			*	*	*	*
Textile		*					*			
Waste water Treatment Plants				*			*	*		

And any other parameter as may be prescribed by the Authority from time to time

### Legend

- a) \* - parameters to be monitored
- b) Frequency – dependent on parameter and reported on a quarterly basis



## FIFTH SCHEDULE

### GENERAL GUIDELINES

#### ***Part I:- Exempted Equipment***

- a) Air pollutant detector, air pollutant recorder, combustion controller or combustion shut-off.
- b) Air conditioning or comfort ventilating systems.
- c) Vacuum cleaning systems used exclusively for office applications or residential housekeeping.
- d) Ventilating or exhaust systems for print storage room cabinets.
- e) Exhaust systems for controlling steam and heat.
- f) Maintenance, repair, or replacement in kind of equipment for which a permit to operate has been issued.
- g) Equipment which emits only nitrogen, oxygen, *carbon dioxide*, and/or water vapour.
- h) Ventilating or exhaust systems used in eating establishments where food is prepared for the purpose of consumption.
- i) Equipment used to liquefy or separate oxygen, nitrogen or the rare gases from the air.
- j) Fireworks display.
- k) Outdoor painting and sand blasting equipment.
- l) Lawnmowers, tractors, farm equipment and construction equipment.
- m) Fire schools or fire fighting training.
- n) Residential wood burning stoves and wood burning fireplaces.
- o) Buildings, cabinets, and facilities used for storage of chemicals in closed containers.
- p) Sewage treatment facilities.
- q) Water treatment units.
- r) Inactive wastewater treatment systems.
- s) Non-contact water cooling towers (water that has not been in direct contact with process fluids).
- t) Laundry dryers, extractors, or tumblers used for fabrics cleaned with a water solution of bleach or detergents.
- u) Equipment used for hydraulic or hydrostatic testing.
- v) Blueprint copiers and photographic processes.
- w) Inorganic acid storage tanks equipped with an emission control device.
- x) Any fuel burning equipment used exclusively for providing domestic electrical power of a capacity not greater than 8KVA.

#### ***Part II:- Guideline on Conversion factors***

##### **a) ppm to mg/m<sup>3</sup> - air**

The conversion between ppm and mg/m<sup>3</sup> is dependent on both the molecular weight of the substance and the temperature at which the conversion is made. The assumption is that the pollutant behaves as an ideal gas and as such, 1 mole of the substance occupies 22.4 litres at standard temperature (273K) and pressure (101.3 kPa). This is consistent with normalised concentrations, and it is therefore not normally necessary to take account of the temperature or pressure difference in the conversion. However, when converting ppm to mg/m<sup>3</sup> at actual discharge conditions, it is important to take account of the necessary factors.

To convert from ppm to mg/m<sup>3</sup>, the following formula should be used:  
**mg/m<sup>3</sup> = ppm x (MW/22.4) x (273/T) x (P/101.3)**

Where MW is the molecular weight of the substance (in grams)  
T is the temperature at which the conversion is to be made (degrees Kelvin)  
P is the pressure at which the conversion is to be made (kPa)

To convert from mg/m<sup>3</sup> to ppm, the following formulae should be used:  
**ppm = mg/m<sup>3</sup> x (22.4/MW) x (T/273) x (101.3/P)**

### **Part III:- Factors to be considered when setting ambient air quality limits**

These factors include:

- a) degree of exposure of sectors of the population, and in particular sensitive sub-groups;
- b) climatic conditions and meteorology;
- c) sensitivity of flora and fauna and their habitats;
- d) historic heritage exposed to pollutants;
- e) transboundary movement;

### **Part IV:- *Emission Reduction Measures of Dark Smoke from Chimneys***

- 1) Avoid overloading burners with fuel oil.
- 2) Use the correct fuel to air ratio by proper adjustment of the air and fuel supplies.
- 3) Avoid flame impingement on any cold surface.
- 4) Avoid carbon build-up in the boiler and furnace tubes and maintain the boiler and furnace settings in good condition.
- 5) Clean the burner at regular intervals and remove the carbon deposits from the nozzle with soft article after soaking, the nozzle in Kerosene.
- 6) Use the correct atomizing nozzle and atomizing pressure.
- 7) Check for worn or distorted parts of the burner and replace the damaged parts.
- 8) Allow sufficient time in lighting up the burners from cold and adopt the correct start-up procedures as recommended by the burner manufacturers.
- 9) Keep the mesh at the inlet of the air blower clear at all times

### **Part V:- *Guideline on emissions report format* –**

The emissions report format shall include:-

- (1) an estimate of the emissions for the relevant calendar year; and
  - (2) all the data applicable to the emissions sources, in respect of the licensed facility.
- (3) Estimates of annual emissions shall be made based on the following methods, in order of preference –
- (a) continuous emission monitoring data;
  - (b) calculation of SO<sub>2</sub> emissions based on fuel use and sulphur content data including combustion processes in which exhaust gases do not come in contact with products;
  - (c) most recent and representative stack monitoring measurements conducted in the previous five years and activity data for the year for which emissions are estimated;
  - (d) emission factor or equivalent methods and activity data for the year;
  - (e) emission factor or equivalent methods and plant capacity data;

- (f) mass balance (including fuel use data) based on the two previous years or the most recent representative year;
- (g) other approved methods supported by calculation and documentation, and the procedures set out in the *guideline document*.

**Part VI:- Measures or operating procedures to control fugitive emissions**

The following Measures or operating procedures may be used to control fugitive emissions:-

- (a) control of fugitive particulate emissions from storage piles through use of enclosures, covers or stabilisation, minimising the slope of the upwind face of the pile, confining as much pile activity as possible to the downwind side of the pile and such other methods or techniques as are approved by the Authority;
- (b) enclosing, covering, watering, or otherwise treating loaded haul trucks and railroad cars, or limiting size of loads, to minimise loss of material to wind and spillage;
- (c) minimising the area of disturbed land or tailings;
- (d) planting special wind break vegetation at critical points;
- (e) prompt removal of coal, rock minerals, soil, and other dust-forming debris from paved roads and scraping and compaction of unpaved roads to stabilise the road surface as often as necessary to minimise re-entrainment of fugitive particulate matter from the road surface;
- (f) minimising the period of time between initially disturbing the soil and re-vegetating or other surface stabilisation;
- (g) restricting the areas to be blasted at any one time;
- (h) restricting the speed of vehicles in or around mining, tailing or quarrying operations;
- (i) re-vegetating, mulching, or otherwise stabilising the surface of all areas adjoining roads that are a source of fugitive particulate emissions;
- (j) substitution of covered conveyor systems for haul trucks;
- (k) synthetic or re-vegetative covers;
- (l) to the extent practicable, restricting vehicular travel to established paved roads;
- (m) watering or chemical stabilisation of unpaved roads as often as necessary to minimise re-entrainment of fugitive particulate matter from the road surface, or paving of roads;

**Part VII:- Opacity Measurement Guidelines**

The darkness of smoke is determined by comparing the shade of smoke to the shades on a Ringelmann Chart which consists of 4 squares with grids, which denoted shade 1 to shade 4. The darkness covered in each of these 4 squares represents 20%, 40%, 60% and 80% opacity respectively.

Ringelmann shade 0 is completely white and shade 5 is totally black. Therefore, Ringelmann shade 1 corresponds to smoke of 20% opacity.

The regulations stipulate that dark smoke emission from any chimney or relevant plant must not exceed: -

- i) 8 minutes in any period of 4 hours; or
- ii) 3 minutes continuously at any one time.

#### **Part VIII:- *Guideline on sources of fugitive emission air pollutants***

The following are the sources of fugitive emissions:

- (a) construction activities;
- (b) storage and handling, including loading and unloading, of materials such as bauxite, alumina, gypsum, or Portland cement or the raw materials therefore;
- (c) mining and quarrying activities;
- (d) haul roads;
- (e) haul trucks;
- (f) tailings piles and ponds;
- (g) demolition activities;
- (h) blasting activities; and
- (i) Sandblasting operations.
- (n) wind breaks; and
- (o) the paving of roads.
- (p) conveyor belts

#### **Part IX:- *Occupational Air Quality Guidelines***

The owner or operator shall control the exposure to employees by: -

- 1) limiting the amount of harmful substances used which may pollute the indoor environment;
  - 2) limiting the number of employees who will be exposed or may be exposed;
  - 3) limiting the period during which an employee will be exposed or may be exposed;
  - 4) introducing engineering control measures for the control of exposure, which may include the following:
    - a. Process separation, automation or enclosure;
    - b. Installation of local extraction ventilation systems to process and equipment
    - c. tools for the control of emission of an air borne hazardous substances;
    - d. Use of wet methods; and
    - e. Substituting hazardous substances with less hazardous ones
  - 5) Providing suitable respiratory protective breathing equipment.
- 2 Where respiratory protective equipment is provided, the employer shall ensure-
- 1) that the relevant equipment is capable of controlling the exposure to below the Occupational Exposure Level for the relevant harmful substance;
  - 2) that the relevant equipment is correctly selected and properly used;
  - 3) that information, instructions, training and supervision which is necessary with regard to the use of the equipment is known to the employees; and
  - 4) that the equipment is kept in good condition and efficient working order.

**Part X:-Guideline on NOxs**

- a) Existing fuel burning equipment shall be presumed to meet the definition of Best Available Technology if the owner or operator proves to the satisfaction of the Authority that the emission levels in the Third Schedule can be met.
- b) If the owner or operator does not prove as described in paragraph (a) of this section, Best Available Technology shall be installed by the owner with the goal of achieving the presumptive emission limits as set forth in the Third **Schedule**.
- c) If actual achievable emission levels following installation of such combustion modification technology are greater than the presumptive emission limits in the Third **Schedule** these actual emission levels will become BAT for those sources.
- d) If the owner or operator does not comply with paragraphs a or b of this section, alternative NO control technology and emission X limitation proposals shall be required and approved by the Authority.
- e) Compliance with the emission levels as determined above is based upon twenty-four hour rolling averaging period, Continuous Emission Monitoring Systems (CEMS) approved by the Authority will be used.

**Part XI:- Guideline on contents of a compliance plan**

A compliance plan shall include: –

- (a) a description of the current compliance status of the facility with respect to all applicable requirements, including all sources that exceed emission standards or targets or are predicted to exceed ambient air quality monitoring locations at which ambient air quality standards or guideline concentrations are exceeded, and any other administrative or other requirements that have not been satisfied;
- (b) a statement of the methods used to determine the facility's compliance status, including a description of all monitoring, record keeping, reporting and test methods, and any other information necessary to verify compliance with or to enforce applicable requirements;
- (c) a statement that the facility will continue to comply with each applicable requirement in respect of which compliance is currently achieved at the facility; and
- (d) in respect of each applicable requirement for which compliance is not currently achieved at the facility –
- (i) a detailed statement of how the facility will achieve compliance;
  - (ii) a proposed compliance schedule setting forth the remedial measures to be taken, including a sequence of actions with milestones leading to compliance;
  - (iii) if the facility is subject to a control order, the proposed schedule of remedial measures shall incorporate the order and shall be at least as stringent as the order;
  - (iv) a schedule for submission of progress reports to the Authority at least once in every six months or more frequently if so required by the licence; and

(v) a schedule for the submission of compliance reports to the Authority, at least once in every six months or more frequently if so required by the licence, indicating what, if any, progress has been made in relation to the schedule and the milestones.

(3) The Authority shall review a compliance plan within ninety days of the receipt thereof, and shall, before the end of that period, notify the person who submitted the plan as to whether the plan is approved, disapproved, or if further information is required:

Provided that where a compliance plan is submitted as part of the requirements of a licence application, such plan shall be reviewed along with all other aspects of the licence application and all provisions relating to the time period for review of licence applications shall apply to the review of the compliance plan.

(4) Where a compliance plan is approved as part of the review of a licence application, such plan shall be affixed to the licence and shall form a part of the terms and conditions of the licence.

(5) Where a compliance plan is disapproved, the notification of such disapproval shall –

(a) set out the reasons for the disapproval; and

(b) inform such person that he is entitled to revise and resubmit the compliance plan within sixty days of the date of delivery of such notification.

(6) If after the review of a resubmitted compliance plan there remain aspects of the plan that are unsatisfactory to the Authority, the Authority may approve the plan subject to such terms, conditions or modifications as it thinks necessary to in order eliminate or mitigate the unsatisfactory aspects of the plan.

(7) Where a compliance plan is made subject to any term, condition or modification under paragraph (6), the notification of the approval of the plan shall contain a written statement of the reasons for inserting the term, condition or modification, as the case may be.

(8) The deadline for the total implementation of a compliance plan shall be no later than Three years from the date of notification of approval of the plan.

(9) In order to ensure that there are equitable conditions in compliance plans and efficient use of the Authority's resources, the Authority shall coordinate and consider together compliance plans for all facilities located close to each other where the emissions from such facilities jointly adversely affect ambient air quality in the vicinity of the facilities.

## **Part XII:- *Guideline for Assessment of Air Quality***

(1) Such assessments, firstly, shall establish actual levels of the given pollutants based on representative measurements, surveys or assessments.

(2) For areas where actual levels of a given pollutant are above the standard values stipulated for that pollutant, the preliminary assessment shall include the following:

- a) establish source contributions to ambient air concentrations of the pollutant of concern;
- b) characterize future trends in ambient air concentrations of the pollutant of concern given a “business as usual” scenario;
- c) identify emission reduction measures suited to reduce contributions from major sources and associated time frames for implementation;
- d) assess the environmental benefit of measures to reduce and maintain air quality within limit values;
- e) determine the technical feasibility of measures to reduce and maintain air quality within limit values;
- f) evaluate the economic viability of measures to reduce and maintain air quality within limit values;
- g) assess the social acceptability and policy applicability measures to reduce and maintain air quality within standard values;
- h) prioritize emission reduction measures on the basis of their environmental benefits, technical feasibility, economic viability, and social acceptability;
- i) determine the time required to reduce air pollutant concentrations to fall within the standard values taking into account the implementation of prioritized emission reduction measures.

**Part XIII:- *Guideline on Results of Emissions Sampling and Analysis***

Results of emissions sampling and analysis shall be as follows:-

(1) Results of emissions sampling and analysis shall be expressed in metric units consistent with the emission standards or targets set out in these Regulations or in the conditions, if any, imposed in the relevant licence.

(2) Measurements of emissions into the atmosphere from stacks, vents or other air pollutant sources, which are reported to the Authority whether voluntarily or as a requirement of these Regulations or of any condition of a licence, shall be reported to the Authority in the form of a test report that includes the following information –

- (a) the testing methods and results, certified as being true, accurate, and in compliance with these Regulations by the person responsible for conducting the emissions test;
- (b) the name and location of the facility, the name and location of the source tested, the purpose of the tests, the test participants and their titles, and the date of the performance test;
- (c) a summary of the results, setting out emission rates for each pollutant and a comparison with applicable emission standards or targets and with any emission limits in the licence;
- (d) a description of the facility tested and the type of process and control equipment utilised;
- (e) a description of the process sampled and associated emission control devices referenced to process, and locations at which sampling took place consistent with information provided in the relevant licence application or licence, as the case may be;

- (f) a schematic of each location sampled including duct diameter, direction of flow, dimensions to nearest upstream and downstream disturbances , including the number of duct diameters, location and configuration of the sampling ports, nipple length and port diameters, and the number and configuration of traverse points;
- (g) confirmation that sampling locations meet the criteria in the test methods set out in the Fifth Schedule, or the reasons why those locations do not meet such criteria and a discussion of the effect on results;
- (h) a discussion of special traversing or measurement schemes (if any);
- (i) a process flow diagram, maximum design capacities, a fuel analysis and heat value for heat input rate determinations, process and control equipment operating conditions, stack height, exit diameter, volumetric flow rate, exit temperature, exit velocity and a discussion of variations from normal plant operations;
- (j) a description of the sampling methods used;
- (k) a brief discussion of the analytical procedures, with justifications for any variance from prescribed method procedures;
- (l) the number of sampling points, time per point and the total sampling time per run;
- (m) a cross-sectional diagram showing sampling points and a diagram of the sampling train;
- (n) a diagram showing stack dimensions, sampling location and the distance from the nearest flow disturbance upstream and downstream, respectively, of the sampling points;
- (o) results and calculations in units consistent with the applicable emission limits with one complete calculation using actual data for each type of test performed;
- (p) the tabulated data and results of the process weight rate or heat input rate in metric units, the referenced or derived conversion factors, the stack gas flow rate, the measured emissions given in units consistent with the applicable emission limits, the visible emissions observations or six consecutive minute average continuous opacity monitor readings, and the average value of emissions from any continuous gaseous emissions monitoring system in units consistent with applicable emission limits;
- (q) quality assurance procedures;
- (r) appendices with raw data and details of calculations, including –
  - (i) raw production data signed by the source official;
  - (ii) photocopies of all raw data;
  - (iii) a chain of custody report; and
  - (iv) copies of all calibration data;

(s) for particulate matter tests, copies of visible emissions evaluations or opacity monitor readings, and, for gaseous pollutant tests, copies of any continuous gaseous emissions monitoring system readings during the tests.

## **SIXTH SCHEDULE**

### **LIST OF CONTROLLED AREAS**

- a) Residential areas, Hospitals,
- b) National Parks,
- c) Reserves and Sanctuaries,
- d) conservation areas,
- e) Central Business Districts
- f) Any other area declared by the Authority from time to time

## SEVENTH SCHEDULE

## ACCEPTABLE EMISSION CONTROL TECHNOLOGIES

## List of Acceptable Emission Control Technologies

	Air Pollutants	Emission Control technologies	Remarks
1.	Particulate Matter	Mechanical collectors (dust cyclones, multicyclones)	
		Electrostatic precipitators	
		Fabric filters (baghouses)	
		Particulate scrubbers	
2.	Nitrogen Oxides (Nox) *	Low NOx burners	
		Selective catalytic reduction (SCR)	
		Selective non-catalytic reduction (SNCR)	
		NOx scrubbers	
		Exhaust gas recirculation	
		Catalytic converter	
3.	Volatile Organic Compounds (VOC), hydrocarbons	Adsorption systems, such as activated carbon	
		Flares	
		Thermal oxidizers	
		Catalytic oxidizers	
		Biofilters	
		Absorption (scrubbing)	
		Cryogenic condensers	

	<b>Air Pollutants</b>	<b>Emission Control technologies</b>	<b>Remarks</b>
4.	Sulphur Oxides (SO <sub>x</sub> )	Wet scrubbers	
		Dry scrubbers	
		Flue gas desulphurization	
5.	Carbon Oxides	Thermal oxidizers	
6.	Hydrogen Sulphides	Absorption (scrubbing)	
7.	Hydrogen Chloride	Dry Scrubbers, Adsorption systems, such as activated carbon	
8.	Dioxins & Furans	Cyclone	
		Electrostatic precipitator	
		Bag filter	
		Wet scrubber	
		Quenching & subsequent wet scrubber	
		Catalytic oxidation (selective catalytic reaction)	
		Catalytic bag filter	
		Dry absorption in resins (carbon particles dispersed in a polymer matrix)	
		Entrained flow reactor with added activated carbon or coke/lime or limestone solutions and subsequent fabric filter	

	<b>Air Pollutants</b>	<b>Emission Control technologies</b>	<b>Remarks</b>
		Fixed bed or circulating fluidized bed reactor, adsorption with activated carbon or open hearth coke	
9.	Metals (Hg, Pb, )	Sorbent Injection Technology	
		Electro-Catalytic Oxidation (ECO)	
		K-Fuel	
10.	Any other technology approved by the Authority from time to time		

**\* Notes**

Best Available Technology (BAT) for this category of equipment will consist of combustion modification technology including either:

- (a) low NO burner technology with low excess air
- (b) Air if technically feasible; or
- (c) flue gas re-circulation with low excess air.

**EIGHTH SCHEDULE**

**EMISSION MONITORING REPORT**

- 1. Name of Industry.....
- 2. Name of contact person.....
- 3. Position of contact person.....
- 4. Business registration No. ....
- 5. Address .....
- Telephone No. .... Fax.....
- Email:.....

6. Source of pollutants

.....

.....

.....

7. Emission concentrations and Quantities (mg/l, kg/day)

.....

.....

.....

8. Emission Control Technology

.....

.....

.....

9. Status of Compliance to Emission Limits

.....

.....

Signature ..... dated ..... day of ..... 20.....

Position .....

**10. Official use only**  
Recommendations

.....

.....

Dated this..... day of ..... 20.....

Signature.....  
(Seal)

**NINTH SCHEDULE**

**EMISSION LICENCES**

**Form I:**

**Application Form for Provisional Emission Licence**

1. Name of Company .....

2. Address

Fax..... E-mail.....

Name of Contact Person .....

3. Location

LR No..... Street..... Area..... .Division.....

Town.....District..... Province

4. Activity .....

5. Duration:

From.....day/...../month...../year

7. *Maximum allowable pollutant concentrations*

(a) *Normal operational conditions*

(i) .....

(ii) .....

(iii) .....

(iv) .....

(b) *Start-up, maintenance and shut-down conditions*

(i) .....

(ii) .....

(iii) .....

(iv) .....

8. Other relevant information on non-point sources or fugitive emissions any other operating requirements relating to atmospheric discharges .....

9. Ambient air quality reporting

(i) on-site point source emission measurement

10. Anticipated Date of compliance .....day.....month.....year.

11. Road map to compliance with standards under Seventh Schedule

(i) .....

(ii) .....

(iii) .....

(iv) .....

13. Review Period ( To be filled out by the Authority)

From.....day/...../month...../year

Upto.....day/...../month...../year

From.....day/...../month...../year

Upto.....day/...../month...../year

Signature of Applicant .....Date.....

Position .....

*FOR OFFICIAL USE*

Approved/Not approved.....

Dated this.....day.....of 20.....

Signature.....

(Seal)

**Form II:**

**Reporting on Emission Limit Exceedence**

1. Name of Company .....

2. Address

P.O.Box.....

Tel.....Fax..... E-mail.....

Name of Contact Person .....

3. Location

LR No..... Street..... Area..... .Division.....

Town.....District..... Province.....

4. Source(s) that Caused the Excess Emissions.

a) .....

b) .....

c) .....

5. First observation of the excess emissions.

a) The time..... date..... of .....Year

6. The cause and expected duration of the excess emissions.

(a) Cause.....

(b) Expected Duration of Exeedence (No.).....hours (No.).....days

(No.).....months

7. Estimated rate of emissions for sources subject to numerical emission limitations  
.....( $\text{mg}/\text{m}^3$ ) (*expressed in the units of the applicable emission limitation*) and the  
*operating data and calculations used in determining the magnitude of the excess emissions*

8. The proposed corrective actions and schedule to correct the conditions causing the excess emissions.

a) .....

b) .....

9. The test methods listed under the Fifth Schedule or any other approved by the Authority shall be used. The results of the tests shall be submitted to the Authority within 45 days after completing the test.

Signature of Applicant .....Date.....

Position .....

**Form III:**

**Provisional Emission Licence**

**THE ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT**

**PROVISIONAL EMISSION LICENCE**

Application Reference No. ....

Licence No. ....

**FOR OFFICIAL USE**

This is to certify that the application for emission into the atmosphere received from ..... (name of applicant) of ..... (address) to the National Environment Management Authority in accordance with Air Quality Regulations for ..... (facility) located at ..... (locality, district and province) has been evaluated and a licence is hereby issued for emission, subject to the attached conditions.

Dated this ..... day of ..... 20.....

Signature: .....

(Official Stamp)

**Director General**  
**The National Environment Management Authority**

**Conditions of Licence**

1. This Licence is valid for a period of ..... from the date hereof.
2. Frequency of Monitoring (Daily/Weekly/Monthly/Quarterly) .....
3. ....
4. ....

**Form IV:**

**Application for Initial Emission Licence**

1. Name of Company .....

2. Address

P.O. Box.....

Tel.....Fax..... E-mail.....

Name of Contact Person .....

3. Location

LR No..... Street..... Area..... .Division.....

Town.....District..... Province.....

4. Type of Industry.....

5. Name(s) of emitting Equipment.....

.....  
.....  
.....  
.....

6. Site Plan Layout, (attach sketch)

(a) Distance of the equipment to the nearest building.....

(b) Height of the above referred building.....

(c) Nearest sensitive area or facility.....

(d) Immission (fall-out) point.....

7. Operating Emission levels

(i) .....

(ii) .....

(iii) .....

(iv) .....

8. Proposed Emission Control Mitigation Measures

(v) .....

(vi) .....

(vii) .....

(viii) .....

9. Additional information required .....

10. Start-up, and shut-down of the equipment

- a) Methods.....
- b) Expected Frequency of Occurrence .....
- c) Duration of occurrence.....
- d) Projected emitted Pollutants
  - (i) .....
  - (ii) .....
  - (iii) .....
  - (iv) .....

11. (a).Nature of emissions (gaseous, particulates)

- (i) .....
- (ii) .....
- (iii) .....
- (iv) .....

(b) Concentration of the emissions

- (i) .....
- (ii) .....
- (iii) .....

Signature of Applicant .....Date.....  
 Position .....

FOR OFFICIAL USE

Approved/Not approved.....  
 Dated this.....day.....of 20.....

Signature.....  
 (Seal)

**Form V:**

**Initial/Renewal Emission Licence**

**THE ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT**

**EMISSION LICENCE**

Application Reference No. ....

Licence No. ....

**FOR OFFICIAL USE**

This is to certify that the application for emission into the atmosphere received from ..... (name of applicant) of ..... (address) to the National Environment Management Authority in accordance with Air Quality Regulations for ..... (facility) located at ..... (locality, district and province) has been evaluated and a licence is hereby issued for emission, subject to the attached conditions.

Dated this ..... day of ..... 20.....

Signature: .....

(Official Stamp)

**Director General**  
**The National Environment Management Authority**

**Conditions of Licence**

1. This Licence is valid for a period of ..... from the date hereof.
2. Frequency of Monitoring (Daily/Weekly/Monthly/Quarterly) .....
3. ....
4. ....
5. ....

**Form VI:**

**Application for Renewal of Emission Licence**

1. Name of industry .....

2. Name of contact person.....

3. Position of contact person .....

4. Business registration No. ....

5. Previous Licence No.....

6. Address .....

    Telephone No. .... Fax.....

    Email:.....

6. Emission source(s).

.....  
.....  
.....  
.....

7. Emission control measures (Environmental Management Plan)

Signature of Applicant .....Date.....

Position .....

*Official use*

Approved/Not approved.....

Dated this.....day.....of 20.....

Signature.....

(Seal)

**FORM VII:**

**Notification of Transfer of Emission Licence**

1.0. Details of Current Licence

Name of current emission licence holder.....  
 PIN No. ....  
 Address .....  
 Telephone No. .... Fax.....  
 Email:.....  
 Application No. of current emission licence.....  
 Date of issue of the current emission licence.....

2. Details of the Transferee

2.1. Name of facility.....  
 2.2. PIN No. ....  
 2.5. Address .....  
 2.6. Telephone No. .... Fax.....  
 2.7. Email:.....  
 2.8. Name of contact person.....

3.0. Capacity of transferee to operate the facility (financial, technological, manpower) (Conditions)

.....  
 .....

4.0. Reasons for transfer of licence

.....  
 .....

5.0. Declaration by transferor and transferee

It is hereby notified that .....of .....on this day of  
 .....transferred emission licence No. ....to  
 .....of .....who will assume his responsibility for all liability  
 under this project.

Transferor	Transferee
Name .....	Name .....
Address.....	Address.....
Signed.....	Signed.....
Date.....	Date.....

6.0. For Official Use

Approved/Not Approved.....

.....  
Comments.....  
.....  
**Officer.....signature.....Date.....**

**FORM VIII:**

**Certificate of Transfer of Emission Licence**

This is to certify that the Emission Licence No. ....issued on .....(date) to  
 .....(name of previous holder) of .....(address) regarding  
 .....(type of facility) whose activities include.....located at.....(town,  
 district) has been transferred to .....(name of new  
 holder).....  
 .....  
 ...(nature of variation) with effect from .....(date of transfer) in accordance with the  
 provisions of the Act.

Dated this.....day of ..... 20.....

Signature.....  
(Seal)

**FORM IX:****Application of Variation of Emission Licence****1. Previous Applications**

(If any).....  
 .....  
 .....

**2. Details of Applicant**

- 2.1. Name of Industry .....
- 2.2. Name of contact person.....
- 2.3. Position of contact person .....
- 2.4. Business registration No. ....
- 2.5. Address .....
- 2.6. Telephone No. .... Fax.....
- 2.7. Email:.....

**3. Details of Current Emission Licence**

- 3.1. Name of current holder.....
- 3.2.No. of current emission licence.....
- 3.3. Date of issue of the current emission licence.....

**4.0. Proposed Variations**

- 4.1. Current emission limits.....  
 .....  
 .....

- 4.2. Proposed variations.....
- 4.3. Reasons for variations.....
- 4.4. Describe the atmospheric effects.....
- 4.5. Describe the effects on ambient air quality.....
- 4.6. Describe the effects on the performance of the equipment.....
- 4.7. Describe the measures proposed to reduce emission impacts.....

**5.0. Declaration by Applicant**

I hereby certify that the particulars given above are correct and true to the best of my knowledge and belief. I understand the emission licence may be suspended, varied or cancelled if any information given above is false, misleading, wrong or incomplete.

Name..... position..... signature.....  
 On behalf of .....(company name and seal).....date.....

*Official use*

Approved/Not approved.....

Dated this.....day.....of 20.....

Signature.....

(Seal)

**FORM X:**

**Certificate of Variation of Emission Licence**

This is to certify that the emission Licence No. ....issued on .....(date) to  
.....(name of firm) of .....(address) regarding  
.....(type of facility) whose activities  
include.....located at.....(town, district) has  
been varied to  
.....  
.....  
.....(nature of variation) with effect from .....(date of  
variation) in accordance with the provisions of the Act.

Dated this.....day .....of 20.....

Signature.....  
(Seal)



**TENTH SCHEDULE**

**RECORD OF POLLUTION EXPOSURE RESULTS**

**Form I: Record of Pollution Exposure Results.**

<b>Record of Pollution Exposure Assessment</b>				
1.	Name of facility.....			
2	Contact Address.....			
	Contact person.....			
3.	Location .....			
4.	Date.....			
5.	Time of the assessment.....			
6.	Type of Work Place.....			
7.	Measuring methods			
	(i).....			
	(ii).....			
	(iii).....			
	(iv).....			
8.	Type of measurements (e.g. gases, dust, fumes....)			
	(i).....			
	(ii).....			
	(iii).....			
9.	Tabulated results of the measurements and compliance limits			
	Pollutant	Measured result	Exposure limit	Remarks
	(i)			
	(ii)			
	(iii)			
	(iv)			
9.	Number of persons exposed.....			
10.	Recommended remedial measures			
	(i).....			
	(ii).....			
	(iii).....			
11.	Name of the assessor.....			
	Signature of the Assessor.....			
	Organization/Company/Firm.....			

**ELEVENTH SCHEDULE****METHODS OF TEST AND MEASUREMENT OF AIR POLLUTANTS****List of methods of test and measurement of air pollutants**

	<b>Standard</b>
1	<a href="#">KS ISO 10155</a> Stationary source emissions -- Automated monitoring of mass concentrations of particles -- Performance characteristics, test methods and specifications
2	<a href="#">KS ISO 10397</a> Stationary source emissions -- Determination of asbestos plant emissions -- Method by fibre count measurement
3	<a href="#">KS ISO 10780</a> : Stationary source emissions -- Measurement of velocity and volume flow rate of gas streams in ducts
4	<a href="#">KS ISO 10849</a> : Stationary source emissions -- Determination of the mass concentration of nitrogen oxides -- Performance characteristics of automated measuring systems
5	<a href="#">KS ISO 11338-1</a> : Stationary source emissions -- Determination of gas and particle-phase polycyclic aromatic hydrocarbons -- Part 1: Sampling
6	<a href="#">KS ISO 11338-2</a> : Stationary source emissions -- Determination of gas and particle-phase polycyclic aromatic hydrocarbons -- Part 2: Sample preparation, clean-up and determination
7	<a href="#">KS ISO 11564</a> : Stationary source emissions -- Determination of the mass concentration of nitrogen oxides -- Naphthylethylenediamine photometric method
8	<a href="#">KS ISO 11632</a> : Stationary source emissions -- Determination of mass concentration of sulfur dioxide -- Ion chromatography method
9	<a href="#">KS ISO 12039</a> : Stationary source emissions -- Determination of carbon monoxide, carbon dioxide and oxygen -- Performance characteristics and calibration of automated measuring systems
10	<a href="#">KS ISO 12141</a> : Stationary source emissions -- Determination of mass concentration of particulate matter (dust) at low concentrations -- Manual gravimetric method
11	<a href="#">KS ISO 14164</a> : Stationary source emissions -- Determination of the volume flow rate of gas streams in ducts -- Automated method
12	<a href="#">KS ISO 15713</a> : Stationary source emissions -- Sampling and determination of gaseous fluoride content
13	<a href="#">KS ISO 7708</a> : Air quality -- Particle size fraction definitions for health-related sampling
14	<a href="#">KS ISO 11041</a> : Workplace air -- Determination of particulate arsenic and arsenic compounds and arsenic trioxide vapour -- Method by hydride generation and atomic absorption spectrometry
15	<a href="#">KS ISO 11174</a> : Workplace air -- Determination of particulate cadmium and cadmium compounds -- Flame and electrothermal atomic absorption spectrometric method
16	<a href="#">KS ISO 15202-1</a> : Workplace air -- Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry -- Part 1: Sampling
17	<a href="#">KS ISO 15202-2</a> : Workplace air -- Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry -- Part 2: Sample preparation
18	<a href="#">KS ISO 15202-3</a> : Workplace air -- Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry -- Part 3:

	<b>Standard</b>
	Analysis
19	<a href="#">KS ISO 15767</a> : Workplace atmospheres -- Controlling and characterizing errors in weighing collected aerosols
20	<a href="#">KS ISO 16107</a> : Workplace atmospheres -- Protocol for evaluating the performance of diffusive samplers
21	<a href="#">KS ISO 16200-1</a> : Workplace air quality -- Sampling and analysis of volatile organic compounds by solvent desorption/gas chromatography -- Part 1: Pumped sampling method
22	<a href="#">KS ISO 16200-2</a> : Workplace air quality -- Sampling and analysis of volatile organic compounds by solvent desorption/gas chromatography -- Part 2: Diffusive sampling method
23	<a href="#">KS ISO 16702</a> : Workplace air quality -- Determination of total isocyanate groups in air using 2-(1-methoxyphenyl) piperazine and liquid chromatography
24	<a href="#">KS ISO 16740</a> : Workplace air -- Determination of hexavalent chromium in airborne particulate matter -- Method by ion chromatography and spectrophotometric measurement using diphenyl carbazide
25	<a href="#">KS ISO 17733</a> : Workplace air -- Determination of mercury and inorganic mercury compounds -- Method by cold-vapour atomic absorption spectrometry or atomic fluorescence spectrometry
26	<a href="#">KS ISO 17734-1</a> : Determination of organonitrogen compounds in air using liquid chromatography and mass spectrometry -- Part 1: Isocyanates using dibutylamine derivatives
27	<a href="#">KS ISO 17734-2</a> : Determination of organonitrogen compounds in air using liquid chromatography and mass spectrometry -- Part 2: Amines and aminoisocyanates using dibutylamine and ethyl chloroformate derivatives
28	<a href="#">KS ISO 20552</a> : Workplace air -- Determination of mercury vapour -- Method using gold-amalgam collection and analysis by atomic absorption spectrometry or atomic fluorescence spectrometry
29	<a href="#">KS ISO 4224</a> : Ambient air -- Determination of carbon monoxide -- Non-dispersive infrared spectrometric method
30	<a href="#">KS ISO 6767</a> : Ambient air -- Determination of the mass concentration of sulfur dioxide -- Tetrachloromercurate (TCM)/pararosaniline method
31	<a href="#">KS ISO 7996</a> : Ambient air -- Determination of the mass concentration of nitrogen oxides -- Chemiluminescence method
32	<a href="#">KS ISO 8186</a> : Ambient air -- Determination of the mass concentration of carbon monoxide -- Gas chromatographic method
33	<a href="#">KS ISO 10312</a> : Ambient air -- Determination of asbestos fibres -- Direct transfer transmission electron microscopy method
34	<a href="#">KS ISO 10313</a> : Ambient air -- Determination of the mass concentration of ozone -- Chemiluminescence method
35	<a href="#">KS ISO 10473</a> : Ambient air -- Measurement of the mass of particulate matter on a filter medium -- Beta-ray absorption method
36	<a href="#">KS ISO 10498</a> : Ambient air -- Determination of sulfur dioxide -- Ultraviolet fluorescence method
37	<a href="#">KS ISO 12884</a> : Ambient air -- Determination of total (gas and particle-phase) polycyclic aromatic hydrocarbons -- Collection on sorbent-backed filters with gas chromatographic/mass spectrometric analyses
38	<a href="#">KS ISO 13794</a> : Ambient air -- Determination of asbestos fibres -- Indirect-transfer transmission electron microscopy method
39	<a href="#">KS ISO 13964</a> : Air quality -- Determination of ozone in ambient air -- Ultraviolet photometric

	<b>Standard</b>
	method.
40	<a href="#">KS ISO 14965</a> : Air quality -- Determination of total non-methane organic compounds -- Cryogenic pre-concentration and direct flame ionization detection method
41	<a href="#">KS ISO 14966</a> : Ambient air -- Determination of numerical concentration of inorganic fibrous particles -- Scanning electron microscopy method
42	<a href="#">KS ISO 16362</a> : Ambient air -- Determination of particle-phase polycyclic aromatic hydrocarbons by high performance liquid chromatography
43	<a href="#">KS ISO 7168-1</a> : Air quality -- Exchange of data -- Part 1: General data format
44	<a href="#">KS ISO 7168-2</a> : Air quality -- Exchange of data -- Part 2: Condensed data format
45	<a href="#">KS ISO 9169</a> : Air quality -- Definition and determination of performance characteristics of an automatic measuring system
46	<a href="#">KS ISO 11222</a> : Air quality -- Determination of the uncertainty of the time average of air quality measurements
47	<a href="#">KS ISO 13752</a> : Air quality -- Assessment of uncertainty of a measurement method under field conditions using a second method as reference
48	<a href="#">KS ISO 14956</a> : Air quality -- Evaluation of the suitability of a measurement procedure by comparison with a required measurement uncertainty
49	<a href="#">KS ISO 20988</a> : Air quality -- Guidelines for estimating measurement uncertainty
50	<a href="#">KS ISO 16622</a> : Meteorology -- Sonic anemometers/thermometers -- Acceptance test methods for mean wind measurements
51	<a href="#">KS ISO 17713-1</a> : Meteorology -- Wind measurements -- Part 1: Wind tunnel test methods for rotating anemometer performance
52	<a href="#">KS ISO 17714</a> : Meteorology -- Air temperature measurements -- Test methods for comparing the performance of thermometer shields/screens and defining important characteristics
53	<a href="#">KS ISO 16000-1</a> : Indoor air -- Part 1: General aspects of sampling strategy
54	<a href="#">KS ISO 16000-2</a> : Indoor air -- Part 2: Sampling strategy for formaldehyde
55	<a href="#">KS ISO 16000-3</a> : Indoor air -- Part 3: Determination of formaldehyde and other carbonyl compounds -- Active sampling method
56	<a href="#">KS ISO 16000-4</a> : Indoor air -- Part 4: Determination of formaldehyde -- Diffusive sampling method
57	<a href="#">KS ISO 16000-5</a> : Indoor air -- Part 5: Sampling strategy for volatile organic compounds (VOCs)
58	<a href="#">KS ISO 16000-6</a> : Indoor air -- Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS/FID
59	<a href="#">KS ISO 16000-8</a> : Indoor air -- Part 8: Determination of local mean ages of air in buildings for characterizing ventilation conditions
60	<a href="#">KS ISO 16000-9</a> : Indoor air -- Part 9: Determination of the emission of volatile organic compounds from building products and furnishing -- Emission test chamber method
61	<a href="#">KS ISO 16000-10</a> : Indoor air -- Part 10: Determination of the emission of volatile organic compounds from building products and furnishing -- Emission test cell method
62	<a href="#">KS ISO 16000-11</a> : Indoor air -- Part 11: Determination of the emission of volatile organic compounds from building products and furnishing -- Sampling, storage of samples and preparation of test specimens
63	<a href="#">KS ISO 16017-1</a> : Indoor, ambient and workplace air -- Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography -- Part 1:

	<b>Standard</b>
	Pumped sampling
64	<a href="#">KS ISO 16017-2</a> : Indoor, ambient and workplace air -- Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography -- Part 2: Diffusive sampling
65	KS ISO 4219: Air quality - Determination of gaseous sulphur compounds in ambient air - Sampling equipment
66	KS ISO 4220: Ambient air - Determination of a gaseous acid air pollution index - Titrimetric method with indicator or potentiometric end-point detection.
67	KS ISO 4221: Air quality - Determination of a mass concentration of sulphur dioxide in ambient air - Thorin spectrophotometric method
68	KS ISO 4225: Air quality - General aspects - Vocabulary
69	KS ISO 4226: Air quality - General aspects - Units of measurement
70	KS ISO 6768: Ambient air - Determination of the mass concentration of nitrogen dioxide - modified Griess - Saltzman method
71	KS ISO 7934: Stationary source emissions - Determination of the mass concentration of sulphur dioxide - Hydrogen peroxide / barium perchlorate – Thorin method
72	KS ISO 8518: Workplace air - Determination of particulate lead and lead compounds - Flame or electrothermal atomic absorption spectrometric method
73	KS ISO 8672: Air quality - Determination of the number concentration of airborne inorganic fibres by phase contrast optical microscopy - Membrane filter method
74	KS ISO 8756: Air quality - Handling of temperature, pressure and humidity data
75	KS ISO 8760: Workplace air - Determination of mass concentration of carbon monoxide - Method using detector tubes for short -term sampling with direct indication
76	KS ISO 8761: Workplace air - Determination of mass concentration of nitrogen dioxide - Method using detector tubes for short -term sampling with direct indication
77	KS ISO 8762: Workplace air - Determination of vinyl chloride - Charcoal tube / gas chromatographic method
78	KS ISO 9096: Stationary source emissions - Determination of the concentration and mass flow rate of particulate material in gas-carrying ducts – Manual gravimetric method
79	KS ISO 9359: Air quality - Stratified sampling method for assessment of ambient air quality
80	KS ISO 9486: Workplace air - Determination of vaporous chlorinated hydrocarbons - Charcoal tube / solvent desorption / gas chromatographic method
81	KS ISO 9487: Workplace air - Determination of vaporous aromatic hydrocarbons -Charcoal tube / solvent desorption / gas chromatographic method
82	KS ISO 9835: Ambient air - Determination of a black smoke index
83	KS ISO 9855: Ambient air - Determination of the particulate lead content of aerosols collected on filters - Atomic absorption spectrometric method
84	KS ISO 10396: Stationary source emissions - Sampling for the automated determination of gas concentrations
85	KS 2060: Motor gasolines - Specification
86	KS 1515: Code of practice for inspection of road vehicles
87	KS 03-1289: Specification for illuminating kerosene
88	KS 1309-1: Specification for diesel fuels - Part 1: Automotive gas oil.
89	KS 03-1309-2: Specification for diesel fuels - Part 2: Industrial diesel oil (IDO).
90	KS 03-1310: Specification for fuel oils
91	KS 03-91: Specification for liquefied petroleum gases (LPG).

**TWELFTH SCHEDULE**  
**ACCEPTABLE MOBILE EMISSION CONTROL TECHNOLOGIES**

**Mobile Sources**

The aim of these guidelines is without sacrificing performance, improve engine performance through understanding pollutant formation mechanism, ensure precise control of engine parameters, such as air/fuel ratio, spark timing, airflow, optimize on exhaust gas treatment.

**List of mobile emission control technologies.**

	<b>Pollutant</b>	<b>Control measures</b>
	NO <sub>x</sub> Exhaust	Exhaust Gas Recirculation (EGR) Valves
	HC, CO Exhaust	Three Way Catalyst (TWC), 2 <sup>nd</sup> Air Pumps
	Evaporative Emissions	Canisters
	Crankcase e/m s	Positive Crankcase Valve PCV valves
	On Board Display (Obd-2)	Precise a/f control
		Dual Oxygen Sensors
		Individual cylinder a/f control
		Adaptive fuel control
		Electronic throttle control
		Improved induction
		Heat optimized exhaust system
		Leak-free exhaust system
	Particulate matter	Diesel Oxidation Catalyst (DOC)
		Diesel particulate filter (DPF)
		Flow Through Filter (FTF)
		Retrofit, Repower, or Replace

And any other technology that may be approved by the Authority from time to time

**List of evaporative emission control technologies**

	<b>Cause</b>	<b>Measure</b>
1	Diffusion	Precise purge control and optimization of canister structure
2	Leakage	Modification of designs for locking parts and fuel filler cap
3	Permeation	Material changes for hoses in fuel line
4	Evaporation while fueling	Improve sealing by putting elastic cap around the nozzle of fueling gun
		Create negative pressure while fuelling by using the venturi effect
5	Fuel Temperature	Reduce the fuel amount returning to fuel tank Limit the fuel tank temperature

**THIRTEENTH SCHEDULE****FEEES**

The fees chargeable under these Regulations shall be as specified hereafter.

- (a) Application for:
  - (i) Emission Licence for listed emitting facility :- *KShs.5,000/=*
  - (ii) Emission Licence for other emitting facility than (i) above:- *KShs.5,000/=*
  - (iii) Variation of emission licence : *KShs.3,000/=*
  - (iv) Transfer of emission licence :- *KShs.3,000/=*
  
- (b) Annual Licence fee for Emission into the atmosphere
  - (i) Facility listed in 6<sup>th</sup> schedule under category I :- *KShs.50,000/=*
  - (ii) Facility listed in 6<sup>th</sup> schedule under category II :- *KShs.30,000/=*
  - (iii) Polluting facility not in 6<sup>th</sup> Schedule other than ( i) and (ii) above :- *KShs.20,000/=*
  
- (c) Inspection of emission monitoring records/emission licence register :- *KShs.200/=*
  
- (d) Variation of emission Licence is 10% of the Annual Licence fee

**FOURTEENTH SCHEDULE**

**LIST OF CONTROLLED FACILITIES**

**Part I**

- (a) Fertiliser manufacturing plants
- (b) Lead recycling plants
- (c) Grain millers
- (d) Hot mix asphalt batching plants
- (e) Incinerators
- (f) Iron and steel mills;
- (f) Kraft pulp mills;
- (g) Manufacture of soda ash
- (h) Mineral processing plants;
- (i) Paint manufacturing plants
- (j) Pesticide formulation and manufacturing plants
- (k) Petroleum refineries and depots;
- (l) Pharmaceutical industries
- (m) Phosphate rock processing plants;
- (n) Portland cement plants (clinker plants included);
- (o) Sulphur recovery plants;
- (p) Sulphuric, or nitric acid plants;
- (q) Thermal power plants
- (r) Thermal and Geothermal power plants
- (s) Any other chemical processing industry

**Part**

- (a) Iron recycling plants;
- (b) Secondary aluminium production plants;
- (c) Plastic recycling plants;

**Part III**

Any other facility that the Authority may identify

**Dated .....,2009**

**HON. JOHN N. MICHUKI, EGH, MP**  
**MINISTER FOR ENVIRONMENT AND MINERAL RESOURCES.**

