LEGAL NOTICE NO.…….

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION (AIR QUALITY) REGULATIONS, 2023

ARRANGEMENT OF REGULATIONS

PART VI: MOBILE SOURCES

PART VII: OCCUPATIONAL AIR QUALITY LIMITS

PART VIII: OTHER SOURCES

PART IX: LICENCES

77. 76 - Offences & Penalties
78. 77 - Pollution Charges
79. 78 – Revocation of LN. 34/2014

SCHEDULES

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT,

(*No. 8 of 1999*)

IN EXERCISE of the powers conferred by sections 147 of the Environmental Management and Co-ordination Act, the Cabinet Secretary for Environment & Forestry makes the following Regulations-

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION (AIR QUALITY) REGULATIONS, 2023

PART 1-PRELIMINARY

Citation.

1. These regulations may be cited as Environmental Management and Co-ordination (Air Quality) Regulations, 2023, and shall come into operation on such date as the Cabinet Secretary 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, No. 8 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 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 contamination of the indoor or outdoor environment by any physical, chemical or biological agent that modifies the natural characteristic of the atmosphere;

"air quality management plan" means a comprehensive integrated and interactive planning across a broad spectrum of air pollution control measures and pollutants among sectors in a defined geographic area;

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

"air quality' means the concentration prescribed under 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;

"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;

"Authority" means the National Environment Management Authority established under the Act;

"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 where ambient air quality standards are being or are likely to be exceeded or any other situation exists which is causing or is likely to cause a significant negative impact on human health, environment and national heritage and will therefore require a specific air quality management plan to rectify the situation designated as such in accordance with the Act;

"Controlled facility" means a stationary or mobile facility or equipment whose operations cause or is likely to cause air pollution which requires emission licensing as listed in the fourteenth Schedule of this Regulations;

"cyclone" means a separator that removes dust, grit or droplet utilizing centrifugal force derived from the motion of the gas;

"days" means working days exclusive of weekends and public holidays;

"degraded area" means an area with poor ambient air quality above the background quality levels;

"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 these Regulations ;

“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;

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

"fugitive emission" means emissions not caught by a capture system which are often due to equipment leaks, evaporative processes and windblown disturbances.

“fugitive emission control plan” means an operating programme that is specifically designed to significantly reduce the fugitive emissions to the lowest level for compliance with the ambient air quality standards;

“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;

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

“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;

“Internationally recognized emission standards” – a document, method, procedure, standard, rules or guidelines that have been developed through consensus of experts from different countries and is approved and published by a globally recognized body, applied worldwide and adopted by the Authority;

“improvement order” means the instructions to a proponent or operator issued in writing by the Authority requiring compliance with the provisions of the Act;

“incineration” means the process of controlled igniting and burning solid, semi-solid, liquid, or gaseous combustible waste at temperatures high enough for complete combustion;

"incinerator" means any equipment, device or contrivance used for the destruction, by controlled burning, of solids, semi-solid, liquids or gaseous combustible wastes;

“indoor air” means air within an enclosed space;

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

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

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

"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;

“mobile source” means a moving producer of air pollutant, mainly forms of transport including motorcycles, tricycles, cars, trucks, cranes, trains, locomotives, ships, tug boats and aircrafts;

“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;

"nitrogen oxides" means the sum of nitric oxide (NO) and nitrogen dioxide (NO_2) 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;

“non-degraded area” means an area with ambient air quality within the background quality level;

“occupational air quality” means the concentration prescribed under the Act of a substance or energy in the atmosphere within a

structure or underground space in which human activities take place;

“odour panel” means group of people screened to have a normal level of odour sensitivity and are trained to assess odours;

“olfactometer” means a scientific device which is used to accurately dilute an odourous sample before it is presented to the panelist;

“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 depletion of the stratospheric ozone layer;

"particulate matter" includes smog, aerosols, fly ash, black carbon, 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 chimneys;

“pollutant” includes any solid, liquid, vapour, gas or aerosol, or combination hereof that causes contamination of the indoor or outdoor environment;

“$PM_{2.5}$” 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;

"PM_{10}" means finely divided solid or liquid material, with an aerodynamic diameter less than or equal to ten micrometers;

“Primary pollutant” means any air pollutant emitted directly from a source;

"priority pollutant" means an air pollutant specified in these Regulations;

"reference method" means any method of sampling, testing and measurement of air pollutants as specified in these Regulations;

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

"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;

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

"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 as guided under part XIV of the Fifth Schedule. ;

"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;

"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;

"vehicle" means a motorcycle, a tricycle, cars, and trucks as defined in KS 1515 and EAS 1047;

"vehicle emission testing center" means any registered facility designated by the Authority for the purposes of testing motor vehicles on exhaust emissions;

'volatile organic compounds' means any organic compound with a boiling point of below 145^{o}C which plays a role in atmospheric photochemical reactions;

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 Cabinet Secretary 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 paragraph (1), the following operations shall be permissible under these Regulations provided that notification is done to the Authority, they are not used for the disposal of waste and shall be subject to appropriate

environmental and social safeguards-

(a) back-burning to control or suppress wildfires;

(b) firefighting rehearsals or drills conducted by fire service agencies;

(c) traditional and cultural burning of savanna grasslands; and

(d) emissions of air pollutants from all stationary and mobile sources as set out under 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 consider necessary, any internationally recognized emission standards, in relation to the air pollutant or air pollutant source.

(5) For the purposes of paragraph (4) the Authority in consultation with relevant lead agencies shall within twelve 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

Air pollution.

5. 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 to cause ambient air quality tolerance limits exceeding those set out in the First Schedule.

Priority air pollutants.

6. No person shall cause or allow emission of the priority air pollutants prescribed in the Second Schedule to cause the ambient air quality limits prescribed in the First Schedule to be exceeded.

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. No person shall cause or allow particulate emissions into the atmosphere from any facility listed under the Fourth Schedule in excess of those limits stipulated under the Third Schedule.

Odour guidelines.

9. A 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 ensure that the odour emission limit comply with the ambient air quality limit set out under the first schedule.

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 following limit determining factors;

a) Degree of exposure of sectors of the population, and in particular sensitive sub-groups.
b) Baseline ambient air quality studies.
c) Climatic conditions and meteorology.
d) Sensitivity of flora and fauna and their habitats.
e) Historic heritage exposed to pollutants.
f) Transboundary movement
g) Any other factor that may be considered by the Authority from time to time.

PART IV - CONTROLLED AREAS

Declaration of a controlled area.

11. The Cabinet Secretary may on the advice of the Authority declare an area as a controlled area.

Air Quality Management Plan.

12. (1) The Authority shall, within two month after the declaration of a controlled area under Regulation 11, in consultation with the relevant lead agencies prepare an air quality management plan for the area and publish the same in the Gazette.

(2) An air quality management plan shall -

(a) be aimed at coordinating air quality management in the area;

(b) address issues related to air quality in the area including source apportionment studies;

(c) contain air quality management system requirements;

(d) contain operational and functional structure requirements;

(e) contain source identification through emission inventories;

(f) contain source reduction alternatives which may be implemented; and

may, for the purposes of implementation, provide for the establishment of an inter-agency/interdepartmental corporation in order to assure that actions are being taken.

(3) The declaration of a controlled area under Regulation 11 may be withdrawn by the Cabinet Secretary with the advice of 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.

(4) An air quality management plan shall lapse upon the withdrawal of the declaration of the controlled area under Sub-regulation 12(3).

PART V - STATIONARY SOURCES

Emission control from listed facilities.

13. (1) No person, 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; or

(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) A 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 twelve months shall be required to apply for an emission licence under regulation 39

(3) The provisions of paragraph (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.

14. 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

15. (1) Any owner or operator of a facility whose operations

control systems.

shall cause or likely to cause emissions of pollutants in excess of the limits shall install pollution control systems.

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

(3) Every owner or operator of a combustion or a process equipment shall employ appropriate emission reduction measures including but not limited to those set out under Part IV of the Fifth Schedule.

Exposure report format.

16. 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 national law relating to occupational safety and health.

Excessive emissions.

17. 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 seven 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.

(c) No owner or operator of fuel burning equipment shall cause or allow emissions of nitrogen oxide in excess of those stipulated in the Third Schedule.

Stack Emission report.

18. (1) A licensee shall submit an emission 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 including but not limited to the matters set out in part V of the Fifth Schedule.

Air quality at property boundary.

19. No owner or operator 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.

Improvement Order

20. (1) An Improvement Order may be issued upon an inspection where there is breach of any provision of these Regulations or of any term or condition of a licence.

(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) An Improvement Order shall-

(a) specify the breach in respect of which it is issued;
(b) specify the steps to be taken to mitigate 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 an improvement order issued under this regulation commits an offence and shall be liable on conviction to a fine not exceeding Kenya Shillings four million or imprisonment for a term not exceeding four years or both such fine and imprisonment;

Fugitive emission control plan.

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

(a) the facility has a fugitive emissions source operating with emissions in excess of twenty percent 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 $PM_{2.5}$ and PM_{10} specified in these Regulations is being exceeded at a location off the boundary of the property on which the source is located.

(2) the fugitive emission management plan shall contain the following;

a. identification of all the sources of emissions
b. assessment of the causes including a site layout drawing indicating each fugitive dust source
c. identification of the relevant mitigations or reduction measures
d. develop an implementation plan of the proposed measures including budget and responsible person.
e. provide training of the responsible personnel on implementation of the plan.
f. implementation of the proposed mitigation or reduction measures
g. monitoring mechanism

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

(4) 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.

(5) 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.

(6) 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.

(7) Where a 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 the term, condition or modification, as the case may be.

(8) The Authority may periodically review any fugitive emission control plan and may where the Authority deems necessary, require that a revised plan be submitted within sixty days after such request.

(9) 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.

22. A fugitive emission control plan may require the employment of measures or operating procedures including but not limited to those indicated in Part VI of the Fifth Schedule

PART VI - MOBILE SOURCES

Internal combustion engines General.

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

Vehicular emission sources.

24. (1) No person shall cause or allow the emission of visible air pollutants from a stationary vehicle, tri-cycle, motorcycle or any other internal combustion engine, in excess of the limits set out under the Kenya Standard KS EAS 1047

Control of mobile 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

Frequency of Emission Testing

25.(1) The Authority may at any time order emission testing of an internal combustion engines releasing visible exhaust emissions, including but not limited to motor vehicle.

(2) In performing its functions under paragraph (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;

(c) Trans-boundary movement of public and private vehicles shall adhere to this regulations.

(3) Every vehicle owner or operator shall ensure their vehicles undergo emission testing at centers designated by the authority as prescribed in 2 above.

(4) all vessels shall undergo emission testing as stipulated under the International Convention for the Prevention of Pollution from Ships (MARPOL).

(5) all aircrafts shall undergo emissions testing as stipulated under the International Civil Aviation Organization.

(6) all locomotives shall undergo emissions testing as stipulated under

(7) the Authority may in undertaking its functions under (1) and (2) designate qualified emission testing centres to undertake those functions on behalf of the Authority.

Designation of Emission Testing Centers

26. (1) The designation of an emission testing centre shall be made upon an application to be submitted to the Authority as per Form XII prescribed in the Ninth Schedule and accompanied by the fees set out in Thirteenth Schedule.

(2) An application to the Authority for designation shall be processed within thirty days from the date of

receipt of the application.

(3) The Authority shall issue guidelines on the designation of emission testing centres.

(4) The authority shall prescribe the code of practice for the designated emission testing centres.

(5) The Authority shall keep a register of the designated emission testing centres which shall be reviewed annually.

Operational License

27. Every designated testing center shall be required to apply for an annual operational license from the Authority as per the prescribed Form …… under the Eighth Schedule accompanied by the prescribed processing and monitoring fee stipulated in the thirteenth schedule.

Methods of test.

28. The emissions from mobile sources shall be tested in accordance with the methods of tests under Part II of the Eleventh Schedule or any other approved method by the Authority.

29. The emission limits for mobile sources shall be as stipulated under existing national, regional and internationally recognized emissions limits-

a. Vehicular emissions limits shall be as stipulated under KS 1515 and EAS1047.
b. Marine vessels emissions limits shall be as stipulated under MARPOL.
c. Aircrafts emission limits shall be as stipulated under ICAO guidelines.
d. Locomotives emissions limits shall be as stipulated under ……?

30. Emission testing shall be undertaken upon payment of the prescribed fees as provided under the thirteenth schedule of this regulations.

Certificate of

compliance

31. (1) The Authority shall issue certificate of compliance for the mobile source that meets the emission limits.

(2) the authority shall issue an improvement notice for non-compliant mobile source and clearly stipulate the compliance period.

(3) any mobile source that fails to meet the emissions limits after the required or the prescribed servicing and maintenance procedures shall be declared environmentally unfit.

(4) upon declaration of the mobile source as environmentally unfit the authority shall notify the agency responsible for registration to deregister the mobile source.

(5) Upon deregistration the Authority shall order scrappage of the environmentally unfit mobile sources in line with the relevant legislation.

Mobile source emission reduction measures.

32. In order to meet the emission standards stipulated by the Authority the owner or operator of a mobile emission source may apply appropriate emission reduction measures.

Dispersion of particulate matter.

33. 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. Any person who causes emissions contrary to the provisions of this regulation, commits an offence.

PART VII - OCCUPATIONAL AIR QUALITY LIMITS

Occupational exposure of air pollutants.

34. The occupier or operator of premises shall ensure that exposure of indoor air pollutants does not exceed the exposure limits stipulated under the national law on occupational safety and health.

Variation of exposure levels.

35. 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.

36. 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;and

(c) take appropriate exposure reduction measures.

PART VIII - OTHER SOURCES

Particulates from material handling.

37. 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.

38. 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.

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

PART IX - LICENCES

Application for an emission licence.

40. The owner or operator of any existing controlled facility shall apply to the Authority for an emission licence every twelve months using the form 4 prescribed in Schedule Nine upon payment of the prescribed fee.

Application procedure for emission licence

41. (1) An owner or operator of a controlled facility shall apply for an 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 a valid stack emission report and any necessary supporting data;

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

(c) the application form is accompanied by proof of payment of the applicable fee as prescribed in the thirteenth schedule.

(3) Where the Authority considers and it is satisfied that the application is complete, it shall issue the applicant with an emission licence in Form III or Form V as set out in the Ninth Schedule within a period of forty five days from the date of receipt of the application;

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

(5) A notification under paragraph4 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

Application for provisional emission license.

42. Further to the provision in regulation 41, where emissions from the facility or activity in the application are exceeding applicable emission standards or target, the Authority may consider issuance of a provisional emission license.

Emission Compliance Plan

43. (1) The owner or operator shall be required to submit an emission compliance plan that indicates the activities and the schedule for bringing the facility into compliance.

(2) the adequacy and completeness of the emission compliance plan shall be as guided under Part XI of the Fifth Schedule.

(3) The Authority shall review an emission compliance plan within fourteen 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:

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

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

(6) 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 fourteen days of the date of delivery of such notification.

(7) 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 in order eliminate or mitigate the unsatisfactory aspects of the plan.

(8) 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.

(9) The deadline for the complete implementation of a compliance plan shall be no later than three years from the date of notification of approval of the plan.

Provisional Emission License

44. (1) Where the Authority is satisfied that the application and emission compliance plan is complete it may issue the Applicant with a provisional emission license as set out in form III set out in the Ninth Schedule.

(2) a provisional emission license issued by the Authority shall be valid for a period of one year from the date of issuance and any subsequent renewal shall not exceed a period of two years based on progressive improvements in implementing the emission compliance plan as shall be determined by the Authority.

Emission License

45. (1) An emission license, shall be in Form IV 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 license.

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

.
Licence processing

46. (1) The Authority shall make a decision in respect of a licence application within fourty five 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 facility; and

(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 incomplete application has been submitted it shall be deemed to have been properly submitted when any clarification or additional information required is satisfactorily submitted to the Authority within the stipulated time lines.

Renewal of emission license.

47. (1) A licensee shall apply to the Authority two months before the expiry of the license for the renewal of the license by submitting an application in Form VI set out in the Ninth Schedule

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

(a) the prescribed emission processing and monitoring fee stipulated under the Thirteenth Schedule; and

(b) a valid stack emission report

(c) an air dispersion modeling assessment report as prescribed under Part XV of the Fifth Schedule

(d) ambient air monitoring;

(e) fugitive emissions control plan

(f) maintenance record for emitting equipment and pollution control system

(g) certificate of analysis for the fuel

(h) any other condition specified in the license

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

Transfer of Emission Licence.

48. (1) Where a licensee 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 accompanied by the prescribed fee under the Thirteenth Schedule at least ninety days prior to any such change.

(2) The Director-General shall consider an application under paragraph (1) within 21 days from the date of receipt and may grant the approval or decline with reasons in writing and forwarded to the applicant.

(3) A license transferred under paragraph (3) shall be only in respect of the facility for which the license was issued.

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

(5) The transferor of a license under these Regulations shall be liable for all liabilities prior to the date of transfer.

(6) The transferee shall be responsible for any future liabilities or any obligations imposed with regard to the license from the date the transfer become effective

Variation of Emission License by holder

49. (1) The holder of an emission license may apply to the Authority for the variation of the license where the licensee wants to vary terms and conditions of an emission license.

(2) An application under paragraph (1) shall be in Form IX set out in the Ninth Schedule and shall be accompanied by the prescribed fee.

(3) Upon receipt of an application for variation of an emission license the Authority may in consultation with the relevant lead agencies consider the

application within twenty one days, and where the application is approved, issue a certificate of variation in Form X set out in the Ninth Schedule.

Variation of emission license by Authority.

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

Suspension, Revocation or Cancellation of Emission Licence.

51. (1) The Authority may at any time, after issuing an emission license under these Regulations, suspend, revoke or cancel the license on such terms and conditions as it may deem fit.

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

(a) the licensee contravenes the conditions set out in the license;

(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 license was issued;

(d) it is established that the information or data given by the licensee in support of the application for an emission license was false, incorrect or intended to mislead;

(e) the licensee fails to obey an improvement order issued under these Regulations; or

(f) the licensee fails to submit and comply with a fugitive emissions control plan or an emission compliance plan as required under these Regulations.

Register of Emission Licences.

52. 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.

PART X - METHODS OF MEASUREMENT AND ANALYSIS

Measurement of air pollutants.

53. (1) A person, owner or operator of a facility listed under the Fourteenth Schedule shall ensure that measurement of emissions levels are carried out in accordance with the methods of test set out in the Eleventh Schedule and any other recognized method of test for that parameter.

(2) The analysis of all measurements in paragraph (1) above shall be carried out by laboratories designated and licensed by the Authority in accordance with the relevant legislation on chemicals management.

Designated and licensed laboratory to undertake air quality measurements

(3) A designated and licensed laboratory shall conduct themselves in accordance with the code of practice as contained in the Fifteenth Schedule to these Regulations or prescribed by the Authority from time to time.

(4) Any designated and licensed laboratory shall undertake air quality measurements in line with the methods of tests as prescribed in the Eleventh schedule.

Measurement of Ambient Air Quality.

54. 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.

Air quality monitoring records

55. (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 at least 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 Thirty days from the date of completion of testing or as may be prescribed by the Authority.

(3) The Authority may, grant an extension of the period specified in paragraph (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.

PART XI - INSPECTION AND MONITORING

Monitoring of ambient air quality.

56. The Authority in consultation with relevant Lead Agencies may carry out monitoring of ambient air quality or request designated and licensed laboratories to do so on its behalf.

Continuous Monitoring System

57. A controlled facility shall install web-enabled continuous emission monitoring system which shall transmit real time emissions data to the Authority.

Stack Height

58. (1) An owner or operator of a controlled facility while installing a stack shall ensure that it complies with the requirements stipulated under part XIV of the Fifth Schedule.

Provision of portholes in stacks.

(2) An 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.

59. Where the Authority requires stack emission tests to be performed under these Regulations, an owner of a 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;and

(c) safe access to sampling platforms.

Stack emission recording and reporting requirements.

60. 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 and in the conditions, if any, imposed in the relevant license.

PART XII - REPORTING

Monitoring Report.

61. (1) An owner or operator of any facility listed in the Fourteenth Schedule shall submit the monitoring Report to the Authority biannually or as may be prescribed by the Authority.

(2) In undertaking the monitoring as provided above, the owner or the operator shall take into account seasonal variations.

(3) The Authority shall convey its written comments on the Report to the owner or the operator within thirty days of the receipt thereof.

Notification of excessive emissions.

62. (1) An 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 time of the occurrence.

(2) An owner or operator of any controlled facility to which paragraph (1) applies shall submit to the Authority a report on exceeded emission limit in the Form II set out in the Ninth Schedule .

PART XIII- MISCELLANEOUS

Guideline for Monitoring air pollutants.

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

Baseline Levels of Priority Air Pollutant.

64. 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.

65. A person who fails to comply with the provisions of these Regulations, commits an offence and is liable on conviction to a fine not exceeding four million Kenya shillings or to imprisonment not exceeding four years or to both such fine and imprisonment.

Charges for pollution.

66. (1) Where the Authority demonstrates through scientific or empirical data 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. PROVIDED that the penalty shall not be charged in cases where;

a. an operator has been issued with a provisional emission license and the same is valid;
b. An operator has obtained an approval from the Authority for an emission compliance plan;
c. Where an operator has notified the Authority of a

breakdown in the emission control system;

d. And any activity under the exemptions clause;

(2) The provisions of paragraph (1) above notwithstanding, continued non-compliance should not compromise on public health, safety and environment.

Appeal

67. A person aggrieved by the decision of the Authority pursuant to the exercise of its powers under this Regulations may appeal in the manner provided in the Act.

68. The Environmental Management and Co-ordination (Air Quality) Regulations, 2014, is revoked.

r 5,6, 7,10, ,33,38

FIRST SCHEDULE
AMBIENT AIR QUALITY TOLERANCE LIMITS

Table 1: Ambient Air Quality Tolerance Limits

	Pollutant	**Time weighted Average**													**Method of Test**
			Kenya	**India**	**Singapore**	**South Africa**	**Nigeria**	**Ethiopia**	**Tanzania**	**EAC**			**WHO value2021**		
										Industrial Area	Residential; urban; Rural & other Area	Controlled Area			
1.	Sulphur oxides (SO_2);	Annual Average*	60 µg/m^3	50		50	0.01	50	40-60	80	60	15		15 µg/m^3	Tetrachloromercurate(TCM)/pararosaniline method in accordance with ISO 6767 ISO 4221
		24 hours **	80 µg/m^3	80	50	125	0.01	125	100	125	80	20	40	30 µg/m^3	
		1 hour				350				500	500	500			
		10 min				500		500	500	500	500	500			
2	Oxides of	Annu								80	60	15			ISO 7996

	Pollutant	Time weighted Average													Method of Test
			Kenya	India	Singapore	South Africa	Nigeria	Ethiopia	Tanzania	EAC			WHO value2021		
										Industrial Area	Residential; urban ; Rural & other Area	Controlled Area			
	Nitrogen(NOx)	al Average													
		24 hours **								150	80	30			
		1 hour													
		10 min								940	500				
3.	Nitrogen Dioxides (NO_2);	Annual Average*	60 µg/m^3	40	40	40	75-113	40	0.1	80	60	15	10	15 µg/m^3	ISO 6768
		24 hours **	80 µg/m^3	80					150	150	80	30	25	30 µg/m^3	
		8 hours							120						

	Pollutant	Time weighted Average													Method of Test
			Kenya	India	Singapore	South Africa	Nigeria	Ethiopia	Tanzania	EAC			WHO value2021		
										Industrial Area	Residential; urban ; Rural & other Area	Controlled Area			
		1 hour			200	200		200					200(Final)		
		Instant peak								940	500				
4	Suspended Particulate Matter(SPM)	Annual Average*								360	140	70			Iso 9835
		24 hours **								500	200	100			
		Annual Average*									100				
		24 hours **								180	180				
5	Respirable Particulate	Annual	0.2 ppm	60	20	50(40:1 year		50	40-60	70	20	20	5		ISO 9835

	Pollutant	Time weighted Average													Method of Test
			Kenya	India	Singapore	South Africa	Nigeria	Ethiopia	Tanzania	EAC			WHO value2021		
										Industrial Area	Residential; urban ; Rural & other Area	Controlled Area			
	Matter (PM_{10}µg/m^3)	Average				target)									EN 12341
		24 Hours	0.4 ppm	100	50	120(75:1year target)	250	150	60-90	150	50	50	15	50(Final)	
		1 hour					600								
6.	Respirable Particulate Matter ($PM_{2.5}$µg/Nm^3)	Annual Average*	140 µg/m^3	40	12	25(20:15:1year targets)		15		35	10	10	5	70 µg/m^3	ISO 9835 EN 14907
		24 hours **	200 µg/m^3	60	37.5	65(40:25:1year targets)		65		75	25	25	15	100 µg/m^3	
7.	Ozone(O_3) µg/Nm^3	Annual							10-100						ISO 13964

	Pollutant	Time weighted Average													Method of Test
			Kenya	India	Singapore	South Africa	Nigeria	Ethiopia	Tanzania	EAC			WHO value2021		
										Industrial Area	Residential; urban ; Rural & other Area	Controlled Area			
		8 Hours	0.12 ppm	100	100	120		120	120	100	100	100	100		UV photometric method: ISO 13964.
		1 hour (instant Peak)	1.25 ppm	180						240	240	240			
8.	Lead (Pb) µg/Nm^3	Annual Average*	0.75 µg/Nm^3	0.5		0.5		0.5		1.0	0.75	0.50	0.5-1.0	0.50 µg/m^3	ISO 9855
		24 hours **	1.00 µg/m^3	1.0						1.5	1.00	75	1.5	0.75 µg/m^3	ISO 9855:1993
											2.5				
9	Carbon	8	2.0	2.0	10	10	10	10	10	5.0	2.0	1.0	4	1.0	ISO 4224

	Pollutant	Time weighted Average													Method of Test
			Kenya	India	Singapore	South Africa	Nigeria	Ethiopia	Tanzania	EAC			WHO value2021		
										Industrial Area	Residential; urban ; Rural & other Area	Controlled Area			
.	monoxide (CO)/ carbon dioxide (CO_2) mg/m^3	hours **	mg/m^3											mg/m^3	
		1 hour	4.0 mg/m^3	4.0.	30	30	20	30	30	10	4.0	2.0	30(WHO Final)	2.0 mg/m^3	
		30 minutes						60	60						
		15 minutes						100	100						
10.	Ammonia(NH3) $\mu g/Nm^3$	Annual *		100											
		24 hours		400											

	Pollutant	Time weighted Average													Method of Test
			Kenya	India	Singapore	South Africa	Nigeria	Ethiopia	Tanzania	EAC			WHO value2021		
										Industrial Area	Residential; urban ; Rural & other Area	Controlled Area			
		**													
11.	Benzene(C_6H_6)	Annual *		5		10(5:1year target)									
	Methane														
12.	Non-methane hydrocarbons									800					ISO 16000-6
13.	Total VOC	24 hours **					160			6mg/NM3	6mg/NM3	6mg/NM3			
14.	Odour														

	Pollutant	Time weighted Average													Method of Test
			Kenya	India	Singapore	South Africa	Nigeria	Ethiopia	Tanzania	EAC			WHO value2021		
										Industrial Area	Residential; urban ; Rural & other Area	Controlled Area			
15.	Dust deposition (Dustfall rate,D ($mg/m^{-2}{\cdot}day^{-1}$)	30 day average				D< 600: Residential									
						D≤ 1200: heavy commercial and industrial									
						1200<D ≤ 2400									

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

Legend

a) *µg- microgram*

b) 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 mg/m^3 and mg/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/m3

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

m)***In coversion of units from ppm to mg/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

	Pollutant	**Time weighted Average**	**Property Boundary**
1	Particulate matter (PM)	Annual Average*	50 µg/m^3
		24 hours**	70 µg/m^3
2.	Oxides of Nitrogen (NO_X);	Annual Average*	80 µg/m^3
		24 hours**	150 µg/m^3
3.	Sulphur oxides (SO_X);	Annual Average*	50 µg/m^3
		24 hours**	125 µg/m^3
4.	Hydrogen Suphide	24 hours**	50 µg/m^3
5.	Ammonia	24 hours**	100 µg/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.

2.1 GUIDELINE AIR QUALITY STANDARDS Guideline standards for priority ambient atmospheric pollutants are given below. Information on additional parameters is provided in Appendix 1. Compound Guideline Value [µg/m3] Averaging time Sulphur dioxide 500 125 50 10 minutes 24 hours 1 year Nitrogen dioxide 200 40 1 hour 1 year Carbon monoxide 100 000 60 000 30 000 10 000 15 minutes 30 minutes 1 hour 8 hours Ozone 120 8 hours Suspended Particulate Matter PM10 50 1 year 150 24 hours PM2.5 15 1 year 65 24 hours Lead 0.5 1 year 2.2

c) For residential premises in designated industrial areas, the above standards do not apply.
d) For industries in designated residential areas, standards for residential areas shall apply.

R6,10, 14, 35

SECOND SCHEDULE

PRIORITY AIR POLLUTANTS

Part I: General Source Pollutants

a) Particulate matter (Dust, black smoke, smog, aerosols);
b) Sulphur oxides (SO_X);
c) Nitrogen oxides (NO_X);
d) Carbon monoxide (CO)
e) Carbon dioxide (CO_2);
f) Hydrocarbons (HC);
g) Volatile organic Compounds(VOC);
h) Hydrogen Sulphide (H_2S);
i) Hydrogen Chloride (HCl);
j) Lead and its compounds;
k) Mercury vapour (Hg)
l) Ozone (O_3);
m) Dioxins and furans (PCDD and PCDF).

Part II: Mobile Source Pollutants

a) Hydrocarbons (HCs)
b) Volatile organic Compounds(VOC);
c) Sulphur dioxide (SO_x)
d) Nitrogen oxides (NO_x)
e) Particulates (PM)
f) Carbon Monoxide (CO)

Part III: Greenhouse gases(GHG)

a) Carbon dioxide (CO_2);
b) Methane (CH_4);
c) Nitrous oxides (N_2O);
d) Hydrofluorocarbons (HCFCs);
e) Perfluorocarbons (PFCs); and
f) Sulphur hexafluoride (SF_6);

Air Pollutant / Industry	Opacity (%)	Particulate ((mg/Nm^3)		Dust (Mg/Nm3)	Sulphur oxide (SO_X) (mg/Nm^3)		Nitrogen oxides (NO_X) (mg/Nm^3)		Dinitrogneoxide (Mg/	Carbon monoxide	Carbon dioxide (mg/Nm^3)	Hydrocarbons (mg/Nm^3)	VOC Mg/Nm3	Ammonia slip in flue	TOC Mg/Nm3	Hydrogen Sulphide	Chlorine (Mg/Nm3)	Hydrogen Chloride	HCN (Mg/Nm3)	Vandadium (Mg/Nm3)	Hydrogen Fluoride	COS +CS2) Mg/Nm3		Ammonia (Mg/Nm3)	Arsenic (Mg/Nm3)	Mercury (Mg/Nm3)	Lead (Mg/Nm3)	Ni, Co,Cr, Sn(Mg/Nm3)	Amines (Mg/Nm3)	Cadmium(Mg/Nm3)	Copper (Mg/Nm3)	Isocyantes (Mg/Nm3)	(Cd+Ti(Mg/Nm3)	Benzoa)	Total Metals g/Nm#	Urea Granulation	Arsine (Mg/Nm3)	Acid MistMg/Nm3	Dioxins/Furans ngTEQ/m3	O2%
		NDA	DA		NDA	DA	NDA	DA																																
Aluminium recycling plants		1 – 5			<50-200		100-300					20			5-50	-		0.5			5																0.1-0.5	
Asphalt mixing batch plants		< 100 t: g/kg			2000		460					20	50																										
		100 to 300 t: 22g/kg																																					
		300 to 500 t: 31g/kg																																					
		> 500 t: 33 g/kg																																					
Cement & Lime plants		New Kiln 25 Exiting kiln 100		5	400		600				500	300		30-50	30			10			1				0.05						0.05		0.5			0.1 ng/Nm^3	10
Cement (Clinker cooling & Cement Grinding)				25																																		
Ceramics manufacture		50			400		600								20			30			5					0.5				0.2							10
Coke & coal plants Thermal drier	20	70			150-200		200-400						150			10						3		30		1.0								1.5			15
Pneumatic coal cleaning equipment	10	40			150-200		200-400						150			10						3		30		1.0								1.5			
Dairy									Refer to limits of boiler applicable																															
Fertilizer plant (Phosphate Fertilizer)		50												50		700 (Nitro		30			5																	

															Phosphate) 70 (Mix acid)																																	
Phosphoric acid plants		50																			5																									3
Nitrogenous Fertilizer plants (Ammonia Plants)		50					300																	50																					3
Nitric Acid Plants		50					200		800															10																					3
Urea /UAN Plants		50											50																									50							3
AN/CAN Plants		50																						50																					3
Iron Foundry		**20a 50b**			**500 50 120**		**400 120 150**			**200 150**			**200 150**			**5 ppm v/v**		**5**			**5**						**1-2**		**5**	**1-2**								**0.1**			**3**
Brass bronze Foundry																																													
Glass Manufacture		100 – Nat. gas 50 – other fuel			700 –nat gas 1500 – other fuel		1000											30			50				1		5			0.2												
Galvanizing operations	*	50																																										
Municipal waste incinerator																																												

Industrial Non – Hazardous Waste Incinerator	10	70 (mg/dscm)		20 ppmv	388 ppmv	137 ppmv				62 ppmv	~~470 µg/m3~~	40 µg/m3		4 µg/m3					0.41 ng TEQ /dscm	7
Hazardous waste Incinerator		1.5 mg/dscm				100 ppmv				21 ppmv	~~8.1 µg.dscm~~	10 µg/dscm		10 µ/dscm					0.11 ng TEQ /dscm	7
Kraft pulp mills Bleached kraft & Kraft unbleached integrated		0.5(TSP) KG/ADt		0.4Kg/ADt	1.5 hard wood 2.0 soft wood															
Sulfite integrated & non integrated integrated		0.15 TSP (Kg/ADt		1.0 Kg/ADt	2.0 Kg/ADt															
Lead Recycling plants			1-5	<50-200	100-300		5-15	5-50										0.5	50	[illegible]
Mineral Processing																				
Mining &																				
Non-ferrous secondary smelters		20 – toxic metals present		400 120	120 150	200 sh	2030		5ppmv	5			1-2	5	5	1-2	5-20			[illegible]

		50 toxic metals absent							aft furnace 150 cold box																												
Paint, printing and varnish manufacturing		50				100-500						1002075100																			0.1						
Pesticides formulation		20; 5-toxic compounds presen									20	20		50	3	3	5	3		3			30														

		t																																					
PPesticide manufacturing		20										20																											
Petroleum Refineries		25 PM 10			150 for SRU 300 for FCC 500		300 and 100 for FCCU									5			5																				
Pharmaceuticals manufacturing plants		20											20-15050		50			30						30															
Printing industry		50					100-500						100,20,75,100																			0.1							
Steel mills		20-50			500		500 750 (Coke Oven)						20			5		10			10		30				22			0.2									0
Sulphuric acid Plants		50														5																							
					5 g/kg																																		

					10.5 g/kg /kg																																		
Sugar Manufacture																																							
Soda ash Manufacture																																							
Tanneries																																							*
Textiles		50										20																											
Geothermal Power plants					*		*									*																							
Thermal Power Plants																																							
Small combustion facilities(3MWth – 50NMWth)Reciprocating internal Combustion Engine (RICE)																																							
Engine (Gas)		N/A			N/A		200 (SI) 1,600(CI)																																

Liquid	KS 1515	50			Use 1.5% sulphur fuel(SF)*		Boreø< 400 mm : 1460 Boreø≥ 400 mm : 1,850																																				
Turbine																																										
Natural Gas																																										
3MWth to < 15MWth		N/A			N/A		42ppm(Electric Generation)(EG) 100ppm(Mechanical Drive)(MD)																																						
15MWth to < 50MWth		N/A			N/A		25ppm																																				
Other fuels																																										

3MWth to < 15MWth		N/A			0.5%SF		96ppm(EG) 150ppm(MD)																															
15MWth to < 50MWth		N/A			0.5% SF or lower		74ppm																															
Boiler																																						
Gas		N/A			N/A		320																															
Liquid		50 or 150 *			2000		460																															
Solid		50 or 150 *			2000		650																															
Combustion Technology/Fuel																																						
RICE																																						

Natural Gas		N/A	N/A		N/A	N/A	200 (SI) 400 (DF)	200(SI) 400(DF/CI)																														
Liquid fuels(>=50MWth to < 300MWth		50	30		1,170 or ≤2%SF	0.5%SF	1,460(CI,Bore ø<400 mm) 1,850(CI, Bore ø≥400 mm) 2,000(DF)																															

Liquid fuels(plant≥ 300MWth		50	30		585 or ≤ 1%SF	0.2%SF	740 **	400
Biofuels/Gaseous fuels other than Natural Gas		50	30		N/A	N/A	30% > Natural Gas & Liquid Fuels	
Combustion Turbine								
Natural Gas (All turbine types of unit> 50MWth)		N/A	N/A		N/A	N/A	51	25
Fuels other than Natural Gas(unit> 50MWth)		50	30		Use 1%SF	Use 0.5%SF		
Boiler								

Natural Gas		N/A	N/A		N/A	N/A	240	240																														
Other Gaseous fuels		50	30		400	400	240	240																														
Liquid Fuels(Plant >=50MWth to < 600MWth)		50	30		900-1500	400	400	200																														
Liquid Fuels(>=600MWth)		50	30		200-850	200	400	200																														
Solid Fuels>=50MWth to < 600MWth)		50	30		900-1500	400	510	200																														
Solid Fuels(>=600MWth)		50	30		200-850	200	1,100 upto volatile matter of fuel < 10%	200																														

Waste water treatment plants							NH_3(100-400)					400-2,000				50-200																						

R8, 14, 15,35,36,64

THIRD SCHEDULE

EMISSION LIMITS FOR CONTROLLED FACILITIES

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

Legend
SF: Suphur Fuel
* 1.5-3.0% only justified by project specific considerations i.e. add secondary treatment to meet levels of 1.5% Sulphur
** dependent on water availability for injection
CI: Compression Ignition
SI: Spark Ignition
DF: Dual Fuel
DA: Degraded Area
NDA: Non-degraded Area
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.

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^3 – cubic metre
ppm – parts per million
t – tonne

r8, *66(2)*
FOURTH SCHEDULE

GUIDELINE ON AIR POLLUTION MONITORING PARAMETERS FROM STATIONARY SOURCES

	Industry / Air Pollutant	**Opacity**	**Particulate (Dust)**	**Sulphur oxide (SO_x)**	**Nitrogen oxides**	**Carbon monoxide**	**Carbon dioxide**	**Hydrocarbons**	**Hydrogen Sulphide (H_2S)**	**Hydrogen Chloride**	**Lead**	**Hg**	**Heavy metals**	**O2 % correction**	**Dioxins/Furans**
	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		*	*											*

	Industry / Air Pollutant	Opacity	Particulate (Dust)	Sulphur oxide (SO_x)	Nitrogen oxides	Carbon monoxide	Carbon dioxide	Hydrocarbons	Hydrogen Sulphide (H_2S)	Hydrogen Chloride	Lead	Hg	Heavy metals	O2 % correction	Dioxins/Furans
	plant														
	Mineral Processing plants		*												
	Mining & Quarry	*	*												
	Municipal and Industrial incinerators	*	*	*	*	*	*	*		*					*
	Non-ferrous smelters, secondary	*	*	*	*	*	*	*	*						*
	Paint and varnish manufacturing		*					*	*	*					
	Pesticides formulation		*					*		*					
	Pesticide Manufacturing plants		*					*							
	Petroleum Refineries			*		*		*							*
	Pharmaceuticals manufacturing plants		*					*		*					
	Printing							*		*					

	Industry / Air Pollutant	Opacity	Particulate (Dust)	Sulphur oxide (SO_x)	Nitrogen oxides	Carbon monoxide	Carbon dioxide	Hydrocarbons	Hydrogen Sulphide (H_2S)	Hydrogen Chloride	Lead	Hg	Heavy metals	O2 % correction	Dioxins/Furans
	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 biannual basis or as may be prescribed by the Authority.

r4,, 10,16, 19, 21,22, 23,31, 36,48,59,60,61, 63,66, 67,71,72, 73

FIFTH SCHEDULE

GENERAL GUIDELINES

Part I:- Exempted Equipment and Activities

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/m3 - air

The conversion between ppm and mg/m^3 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/m3 at actual discharge conditions, it is important to take account of the necessary factors.

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

h) .

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*:-* *emissions report format –*

The emissions report format shall include:-
(a) an estimate of the emissions for the relevant calendar year.
(b) all the data applicable to the emissions sources, in respect of the licensed facility.

(c) Estimates of annual emissions shall be made based on the following methods, in order of preference –

(1) continuous emission monitoring data;

(2) calculation of SO_2 emissions based on fuel use and sulphur content data including combustion processes in which exhaust gases do not come in contact with products;

(3) most recent and representative stack monitoring measurements conducted in the previous five years and activity data for the year for which emissions are estimated;

(4) emission factor or equivalent methods and activity data for the year;

(5) emission factor or equivalent methods and plant capacity data;

(6) mass balance (including fuel use data) based on the two previous years or the most recent representative year;

(7) other approved methods supported by calculation and documentation, and the procedures set out by the Authority

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

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

(a) 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)by 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) by minimising the area of disturbed land or tailings.

(d) by planting special wind break vegetation at critical points.

(e)by 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)by minimising the period of time between initially disturbing the soil and re-vegetating or other surface stabilization.

(g)by restricting the areas to be blasted at any one time.

(h)by restricting the speed of vehicles in or around mining, tailing or quarrying operations.

(i) by re-vegetating, mulching, or otherwise stabilising the surface of all areas adjoining roads that are a source of fugitive particulate emissions.

(j) by substituting covered conveyor systems for haul trucks.

(k) by using synthetic or re-vegetative covers.

(l)by restricting vehicular travel to established paved roads.

(m) by 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 four squares with grids, which denoted shade 1 to shade 4. The darkness covered in each of these four squares represents twenty percent, fourty percent, sixty percent and eighty percent opacity respectively. Ringelmann shade O is completely white and shade 5 is totally black. Therefore, Ringelmann shade 1 corresponds to smoke of twenty percent opacity.

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

i) 8 minutes in any period of four 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.
    e. Substituting hazardous substances with less hazardous ones.
5) Providing suitable respiratory protective breathing equipment.

6)Where respiratory protective equipment is provided, the employer shall ensure-
a) that the relevant equipment is capable of controlling the exposure to below the Occupational Exposure Level for the relevant harmful substance;
1) b) that the relevant equipment is correctly selected and properly used;
2) c) that information, instructions, training and supervision which is necessary with regard to the use of the equipment is known to the employees; and
3) d) 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 Best Available Technology 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 approved by the Authority will be used.

Part XI*:-* ***contents of a compliance plan***
A compliance plan shall include but not limited to: –

(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.

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 Eleventh 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;

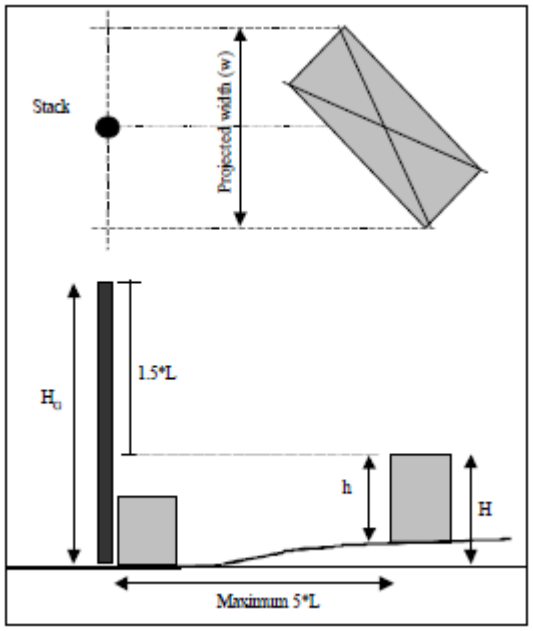
(r) appendices with raw data and details of calculations, including –

(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.

Part XIV: Minimum Stack Height Requirements



Hg = H + 1.5L; where

Hg = Good Engineering Practice stack height measured from the ground level elevation at the base of the stack

H = Height of nearby structure(s) above the base of the stack

L= Lesser dimension, height(h)or width(w), of nearby structures

'Nearby Structures' = Structures within/touching a radius of 5L but less than 800m

(j) as part of the baseline ambient air quality assessment report to be submitted once at the first renewal.
(k) In order to determine the impacts of emissions from stationary sources at a certain location on will carry out an air dispersion assessment on the facility.
(l) In determination of the fall out point of an existing facility the input data into the dispersion model shall its actual operating parameters.
(m) Determination of the fall out point of a proposed facility, the input data into the dispersion model shall be its designed parameters.
(n) The dispersion modeling report to be submitted to the Authority shall be in the dispersion modelling report format prescribed under Part…….. of the Fifth Schedule.
(o) Dispersion modeling assessment referred to above shall be carried out using the dispersion models prescribed under part…. of the methods of test and analysis.

r11

SIXTH SCHEDULE

LIST OF CONTROLLED AREAS

a) Residential areas,
b) Hospitals,
c) Learning institutions
d)
e) National Parks,
f) Reserves and Sanctuaries,
g) conservation areas,
h) Central Business Districts
i) Mixed use areas
j) Any other area declared by the Authority from time to time

r16,72

SEVENTH SCHEDULE

ACCEPTABLE EMISSION CONTROL TECHNOLOGIES AND STRATEGIES

List of Acceptable Emission Control Technologies

	Air Pollutants	Emission Control technologies and strategies	Remarks
1.	Particulate Matter	Mechanical collectors (dust cyclones, multicyclones)	
		Electrostatic precipitators	
		Filter bagFilter bags (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	
4.	Sulphur Oxides (SOx)	Wet scrubbers	
		Dry scrubbers	
		Flue gas desulphurization	
5.	Carbon Oxides	Thermal oxidizers	
6.	Hydrogen Sulphides	Absorption (scrubbing)	
7.	Hydrogen Chloride	Dry Scrubbers, Absorption systems, such as activated carbon	
8.	Dioxins & Furans	Cyclone	
		Electrostatic precipitator	
		Filter bag	
		Wet scrubber	

	Air Pollutants	Emission Control technologies and strategies	Remarks
		Quenching & subsequent wet scrubber	
		Catalytic oxidation (selective catalytic reaction)	
		Catalytic Filter bag	
		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 Filter bag	
		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.	Particulate matter, Sulphur oxides, nitrogen oxides	Cleaner fuels, Sustainable aviation fuels, raw materials substitution, processed change or modification	
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.

r 65

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

r40,

NINTH SCHEDULE

EMISSION LICENCES

Form I:

Application Form for Emission Licence

1. Name of Company ……..
2. Address
   Fax…… E-mail…… …….
   Name of Contact Person …….

3. Location
   LR No…… Street…… Area…… .Sub- County…….
   Town…….County……..

4. Activity ……

5. Duration:
   From…….day/……./month……./year

7. Stack Emissions
(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) ……

Signature of Applicant ……..Date……

Position ……..……

FOR OFFICIAL USE

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

Approved/Not approved…….

Dated this…….day…….of 20…….

Signature……
(Seal)

r18, 69

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…… .Ward…….. Town…….Sub-County…….. County……

4. Source(s) that Caused the Excess Emissions.
   a) ……
   b) ……

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 ……..(mg/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. ……..

r41

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 Occurence ……
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)

r41

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)

r45

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……
……

r45

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)

r46

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)

r46

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)

r51

Form XI:

Register of Emission Licence

Type of Industry	Name of proponent	Location of facility	Emission licence No.	Date of Issue	Conditions attached to Licence	Licence Serial No. if	Status of Licence	Name of filing officer	Date and Signature of filing officer	Remark

FORM XII

National Environment Management Authority

APPLICATION FOR DESIGNATION OF VEHICLE EMISSION TESTING CENTRE

APPLICATION FORM

NEMA Reference Number.....

Introduction and instructions

1. This application form should be completed in detail and returned with the Emission Testing Center's control manual or equivalent documents.

2. Additional information may be given on supplementary sheets clearly indicating the paragraphs to which they refer. When the information requested is contained in the Control Manual, it is sufficient to enter a reference to the appropriate section of the Control Manual.

3. Information provided will be treated in confidence where the applicant has disclosed the information as being Confidential Business Information.

PART A: GENERAL INFORMATION

1. Name and Address of Firm Postal Address Telephone No. Email Address *(Attach CR12/certificate of registration)* Tax Compliance Certificate PIN Certificate Business Permit EIA license/Environmental audit acknowledgement letter (*attach*) Work place registration by DOSHS	
2. (a) Proprietor(s) name(s) (b) Name, Position and address of the contact person (if different from that given in 2(a) above) (c) Enclose an organizational chart showing the outline of the organization and the chain of command from the highest executive down to the emissions assessor	

3	Physical Location of the Firm L.R No. (attach a copy of title deed or lease agreement) GPS Coordinates Land size (As is applicable) Road/Street Town County	
4	Name and Address of parent/joint venture organization, if applicable Telephone No. Email Address:	

PART B: WORK AREA OF THE EMISSION TESTING CENTER

5. Total Area (m^2) of vacant Space available for parking of vehicles for emissions testing (As applicable)……

6. No. of vehicles that can be parked within the vacant space (As applicable)……

7. Provide traffic management plan (As applicable)…… ……

8. Attach a layout plan drawn to scale of the proposed Vehicle Emission testing Centre (As applicable)

9. Capacity of the VETC as defined in KS 2499

i. Grade A……
ii. Grade B……..
iii. Grade C……
iv. Mobile……

PART C. TECHNICAL INFORMATION

I. EMISSION TESTING OF PETROL POWERED VEHICLES

10. Type of Emission Testing Equipment available

Description	Two Gas (CO, HC) Analyzer	Four Gas (CO, HC, CO_2, O_2) Analyzer	Five Gas (CO, HC, CO_2, O_2, NO_2) Analyzer	More than 5 gases Analyser
Name of Equipment				
No. of equipment				
Make				
Model				
Serial No.				
Year of Manufacture				
Date of procurement				
Type of Approval if any				
Resolution				
Range of measurement				
Web Enabled				

11. Details of Emission Testing Equipment (Technical Specification of Equipment) Attach brochure for the Equipment

II. EMISSION TESTING FOR DIESEL POWERED VEHICLES

12. Type of emission testing equipment available

(If the number of equipment is more than 1, provide information in separate sheet using the format provided)

a) No. of equipment
b) Make:
c) Model:
d) Serial no:
e) Year of manufacture
f) Type of approval

13.Details of Emission Testing Equipment (Technical Specification of Equipment) Attach brochure for the Equipment

14. Emission testing equipment located at: Open area…☐ .Inside a room ☐ Under shed ☐

15. Is the testing site well ventilated to guarantee safety of the operator of the testing equipment?: Yes No ☐ (If ☐, what is the cautionary measure?)

16. Test Procedures

Provide details of the test procedures for vehicles as guided by EAS 1047:

i) Chassis Dynamometer test
ii) Real Driving Environment / On road Tail Pipe Measurement
iii) On Board Diagnostics (OBD –II)

17. Quality Control

Applicants will be required to;

i. Attach calibration procedure
ii. Demonstrate compliance to ISO 17025

PART C: INFRASTURUCTURE FACILITIES

18. Other facilities available for emission testing

a) Computer	Yes ☐ No ☐	e) Printing facility with date, time, photograph of vehicle number plate & test data	Yes ☐ No ☐
b) Software for data transfer	Yes ☐ No ☐		
c) web camera	Yes ☐ No ☐		
d) Computer printer	Yes ☐ No ☐	f) Test data storage & transfer facility	Yes ☐ No ☐

19. Quality Management Systems

Demonstrate compliance with section 5 of KS2499 and any other internationally recognized best practices with emphasis on;

i) Quality documentation & documentation control
ii) Review of the Quality Management System
iii) Work Instructions
iv) Corrective actions
v) Personnel
vi) Facilities and Control of testing and measuring equipment
vii) Sub – contractors engagement
viii)Handling of technical records
ix) Statistical returns to NEMA & other relevant national authorities
x) Engagement with NEMA & other relevant authorities
xi) Management of customer complaints

PART D: PERSONNEL FOR VEHICLE EMISSIONS TESTING CENTER

20. List the names, technical qualifications and relevant experience for Head of vehicle testing center, Deputy Head, Technical Manager, Quality Control Manager (If he is not the Technical Manager) and Persons authorized to sign test reports.

21. Testing centres should demonstrate compliance to section 5.5 of KS 2499

i. At least 2 competent emissions assessors:
ii. Name & professional qualification of the operators (Attach testimonials as per the Guideline on Designation of Vehicular Emission Testing Centers)
iii. Whether undergone any training by the equipment supplier Yes ☐ No… ☐
(If yes, attach copies of the certificates)

22. Is the vehicle emission testing centre prepared to provide expert witness to appear in a court of Law to substantiate test reports if required?

PART E: OTHER INFORMATION

23. Petrol Vehicles

No. of tests done within the last 6 months	
No. of test result complied with standard	
No. of test results failed	
No. of tests carried out	

24. Diesel Vehicles

No. of tests done within the last 6 months	
No. of test result complied with standard	
No. of test results failed	
No. of tests carried out	

The statements made in this application form are true and correct to the best of my knowledge and belief

…… ……..

(Full Signature of the Applicant) Date Company Seal

Part F: For Official Use

Approved ☐ Not approved ☐

Comments……
……
……
……

Officer's Name……

Designation……

Signature…… Date……

r17

TENTH SCHEDULE

RECORD OF POLLUTION EXPOSURE RESULTS

Form I: Record of Pollution Exposure Results.

	Record of Pollution Exposure Assessment			
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 ANALYSIS OF AIR POLLUTANTS

The following referenced documents are indispensable for the application of these regulations. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. Information on currently valid national and international standards can be obtained from the Kenya Bureau of Standards.

Part I: Stationary sources

Stationary sources			
a) Automated measurement system			
	Parameter	Method of test	Recommended minimum sampling time (minutes) per each of 3 runs
1	Traverse Points(duct diameter > 300mm)	Us epa Method 1	NA
2	Traverse Points(duct diameter ≤ 300mm)	Method 1a	NA
3	Velocity - S-type Pitot	Method 2	NA
4	Gas Volume	Method 2a	NA
5	Exhaust Volume Flow Rate	Method 2b	NA
6	Gas Velocity and Volumetric Flow Rate-Standard pitot	Method 2c	NA
7	Rate Meters	Method 2f	NA
8	Flow Rate Measurement with 3-D Probe	Method 2F	NA
9	Flow Rate Measurement with 2-D Probe	Method 2G	NA
10	Flow Rate Measurement with 2-D Probe	Method 2H	NA
11	Molecular Weight	Method 3	NA
12	CO2, 02 by instrumental methods	Method 3a	NA
13	CO2, 02 by Orsat apparatus	Method 3b	NA
14	CO2, CH4, N2, 02 by determined by thermal conductivity	Method 3c	NA
15	Moisture Content	Method 4	NA
16	Particulate Matter (PM)	Method 5	60
17	Particulate Matter (PM)	Method 5	60
18	Particulate Matter (PM) Asphalt plants	Method 5a	60
19	Particulate Matter (PM)	Method 5b	60
20	Particulate Matter (PM)	Method 5c	60
21	Particulate Matter (PM)	Method 5d	60
22	Particulate Matter (PM) Fiberglass Plants	Method 5e	60
23	Particulate Matter (PM) Catalytic	Method 5f	60

	Cracking Unit		
24.1	Particulate Matter (PM10)- Low Level Particulate Matter Emissions	Method 201a	60
24.2	Total Particulate Matter (PM)	Method 17	60
25	Sulphur Dioxide (S02)	Method 6c	
26	Nitrogen Oxide (NOx)	Method 7e	
27	Sulfuric Acid Mist	Method 8	
28	Opacity	Method 9	
29	Carbon dioxide	Method 10	
30	Hydrogen sulphide	Method 11	
31	Particulate matter (in-stack particulates)	Method 17	60
32	Volatile organic compounds	Method 18	
33	Opacity	Method 22	
34	Chlorine	Method 26	
35	Dioxins & furans	Method 23a	180
36	Total hydrocarbons	Method 25a	
37	Heavy Metals	Method 29	
38	Total vapour mercury	Method 30	
39	Condensable particulate matter	Method 202	
40	Odour	Olfactometry	

b) Manual measurement system

NO.	Parameter	Method of test	Recommended minimum sampling time (minutes)per each of 3 runs
1.	Particulate Matter	KS ISO 10155	120
2.	Concentration and mass flow rate	KS ISO 9096 - Manual gravimetric method	
3.	Velocity and volume flow rate	KS ISO 10780	
4.	*Asbestos*	*KS ISO 10397*	
5.	Nitrogen oxides	*KS ISO 10849*	
6.	*Gas and particle-phase polycyclic aromatic*	*KS ISO 11338-1Sampling*	

	hydrocarbons		
7.	*Gas and particle-phase polycyclic aromatic hydrocarbons*	*KS ISO 11338-2: Sample preparation, clean-up and determination*	
8.	Nitrogen oxides – Naphthylethylenediamine photometric method	*KS ISO 11564*	
9.	Sulphur dioxide	KS ISO 11632–Ion chromatography method	
10	Sulphur dioxide	KS ISO 7934- Hydrogen peroxide / barium perchlorate – Thorin method	
11	Carbon monoxide, carbon dioxide and oxygen	*KS ISO 12039* – calibration of automated measuring systems	
12	Particulate matter (dust) at low concentrations	*KS ISO 12141-* Manual gravimetric method	
13	Volume flow rate of gas streams in ducts	*KS ISO 14164(*USEPA)	
14	*Gaseous fluoride*	*KS ISO 15713*	*60*
15	Particle size fraction	*KS ISO 7708*	
16	Organonitrogen compounds(Isocyanates)	*KS ISO 17734-1:LCMS(*dibutylamine derivatives)	
17	Organonitrogen compounds(Amines and aminoisocyanates	*KS ISO 17734-2:LCMS(*dibutylamine and ethyl chloroformate derivatives)	
18	*gas concentrations*	*KS ISO 10396- automated determination*	
19	*Hydrogen sulphide*	*Us epa method 11*	*60*
20	*Odour*	*ISO 17299* *ISO 13301* *ISO 16000-28*	*10*
21			
22			
23			

+

Part II: Mobile Sources

a) Automotive Engines

NO.	Vehicle Category - Parameter	Method of test
1	Passanger cars Duty Diesel Vehicles-Exhaust emissions(carbon dioxide; Nitrogen Oxides; Hydrocarbons; Particulate matter)	KS EAS 1047 – Annex C
2	Light Duty Commercial Vehicles-Exhaust emissions(carbon dioxide; Nitrogen Oxides; Hydrocarbons; Particulate matter)	KS EAS 1047 – Annex C
3	Trailers;Heavy Duty Diesel Vehicles-Exhaust emissions(carbon dioxide; Nitrogen Oxides; Hydrocarbons; Particulate matter)	KS 1515; ISO 16183
4	Gasoline and LPG Powered vehciles-Exhaust emissions(carbon dioxide; Nitrogen Oxides; Hydrocarbons)	ISO 16183
5	Gasolines powered Motorcycles-Exhaust emissions(carbon dioxide; Nitrogen Oxides; Hydrocarbons)	ISO 6460-2
6	All Gasolines powered Motor tricycles-Exhaust emissions(carbon dioxide; Nitrogen Oxides; Hydrocarbons)	ISO 6460-2
7	All categories (diesel powered)-Smoke density	KS EAS 1047 – Annex E
8	Motor gasolines	KS 2060
9	Illuminating kerosene	KS 03-1289
10	Automotive gas oil.	KS 1309-1
11	Industrial diesel oil (IDO).	KS 03-1309-2
12	Fuel oils	KS 03-1310
13	Liquefied petroleum gases (LPG)	KS 03-91
14	Vehicular emission Testing facilities	KS 2409
15	Evaporative Emissions – Motor cycles	ISO 21755

(b): Non-Automotive Diesel and Gas Engine Exhaust emissions

(i) Locomotive engines

NO.		
	Parameter	Method of test
1.	Nitrogen oxides	ISO 8178-1; USEPA Method 7E
2	Carbon monoxide	ISO 8178-1; USEPA Method 10
3	Total hydrocarbons	ISO 8178-1; USEPA Method 25A

4.1	Sulphur dioxide(after engine)	ISO 8178-1;
4.2	Sulphur dioxide(after flue gas desulphurisation)	ISO 8178-1; USEPA Method 6C
5	Oxygen	ISO 8178-1; USEPA Method 3A
6.1	Particulate Matter(Fuel Sulphur content≤0.05% Weight)	ISO 8178-1; Dilution method
6.2	Particulate Matter(All Fuel Sulphur contents after engine and before heat recovery unit)	ISO 9096; USEPA Method 17 Direct measurement method(dry dust method)
6.3	Particulate Matter(measurement after heat recovery boiler(flue gas temperature < 160°C or low temperature flue gas cleaning system (flue gas temperature < 160°C)	ISO 9096; USEPA Method 5B Direct measurement method(dry dust method)
6.4	PM_{10} or $PM_{2.5}$	ISO 8178 USEPA 201A
7	Smoke	ISO 8178-3;(Filter type smoke meter) ISO 10054 (steady state conditions – filter type smoke meter)
9	Smoke- smoke density	ISO 8178-3 ISO 11614
10	Measurement uncertainties and acceptance	VDI 2048

(ii): Land Based Diesel Power Plants

NO.		
	Parameter	Method of test
1.	Nitrogen oxides	ISO 8178-1; USEPA Method 7E
2	Carbon monoxide	ISO 8178-1; USEPA Method 10
3	Total hydrocarbons	ISO 8178-1; USEPA Method 25A
4.1	Sulphur dioxide(after engine)	ISO 8178-1;
4.2	Sulphur dioxide(after flue gas desulphurisation)	ISO 8178-1; USEPA Method 6C
5	Oxygen	ISO 8178-1; USEPA Method 3A
6.1	Particulate Matter(Fuel Sulphur content≤0.05%	ISO 8178-1;

	Weight)	Dilution method
6.2	Particulate Matter(All Fuel Sulphur contents after engine and before heat recovery unit)	ISO 9096; USEPA Method 17 Direct measurement method(dry dust method)
6.3	Particulate Matter(measurement after heat recovery boiler(flue gas temperature < 160°C or low temperature flue gas cleaning system (flue gas temperature < 160°C)	ISO 9096; USEPA Method 5B Direct measurement method(dry dust method)
6.4	PM_{10} or $PM_{2.5}$	ISO 8178 USEPA 201A
7	Smoke	ISO 8178-3;(Filter type smoke meter) ISO 10054 (steady state conditions – filter type smoke meter)
9	Smoke- smoke density	ISO 8178-3 ISO 11614
10	Measurement uncertainties and acceptance	VDI 2048

(iii): Marine Engines and Land Based Gas Power Plants

NO.		
	Parameter	Method of test
1.	Nitrogen oxides	ISO 8178-1; USEPA Method 7E
2	Carbon monoxide	ISO 8178-1; USEPA Method 10
3.1	Non-Methane hydrocarbons(NMHC) after engine with no oxidation catalyst	ISO 8178-1; USEPA Method 25A
3.2	Non-Methane hydrocarbons(NMHC) after oxidation catalyst	ISO 8178-1; USEPA Method 18 USEPA Method 320
4.1	Volatile Organic Compounds or non-methane /non-ethane hydro carbons-after engine without catalyst	ISO 8178-1; USEPA Method 25A
4.1	Volatile Organic Compounds or non-methane /non-ethane hydro carbons-after oxidation catalyst	ISO 8178-1; USEPA Method 18 USEPA Method 320
5	Oxygen	ISO 8178-1; USEPA Method 3A
6.1	Particulate Matter(Fuel Sulphur content≤0.05% Weight)	ISO 8178-1; Dilution method
6.2	Particulate Matter(after engine and before heat	ISO 9096;

	recovery unit; before flue gas cleaning system)	USEPA Method 17 Direct measurement method(dry dust method)
6.3	Particulate Matter(measurement after heat recovery boiler(flue gas temperature < 160°C or low temperature flue gas cleaning system (flue gas temperature < 160°C)	ISO 9096; USEPA Method 5B Direct measurement method(dry dust method)
6.4	PM_{10} or $PM_{2.5}$	ISO 8178 USEPA 201A
7	Smoke	ISO 8178-3;(Filter type smoke meter) ISO 10054 (steady state conditions – filter type smoke meter)
9	Smoke- smoke density	ISO 8178-3 ISO 11614
10	Measurement uncertainties and acceptance	VDI 2048

(iv): Marine and Land based power plants

NO.		
	Parameter	Method of test
1.	Nitrogen oxides	ISO 8178-1; USEPA Method 7E
2	Carbon monoxide	ISO 8178-1; USEPA Method 10
3	Total hydrocarbons	ISO 8178-1; USEPA Method 25A
4.1	Sulphur dioxide(after engine)	ISO 8178-1;
4.2	Sulphur dioxide(after flue gas desulphurisation)	ISO 8178-1; USEPA Method 6C
5	Oxygen	ISO 8178-1; USEPA Method 3A
6.1	Particulate Matter(Fuel Sulphur content≤0.05% Weight)	ISO 8178-1; Dilution method
6.2	Particulate Matter(All Fuel Sulphur contents after engine and before heat recovery unit)	ISO 9096; USEPA Method 17 Direct measurement method(dry dust method)
6.3	Particulate Matter(measurement after heat recovery boiler(flue gas temperature < 160°C or low temperature flue gas cleaning system (flue gas temperature < 160°C)	ISO 9096; USEPA Method 5B Direct measurement method(dry dust method)
6.4	PM_{10} or $PM_{2.5}$	ISO 8178

		USEPA 201A
7	Smoke	ISO 8178-3;(Filter type smoke meter) ISO 10054 (steady state conditions – filter type smoke meter)
9	Smoke- smoke density	ISO 8178-3 ISO 11614
10	Measurement uncertainties and acceptance	VDI 2048

Part III: Ambient Air Quality Measurements

	i) Automated Measurement System	Method of Test
1.1	Particulate Matter (PM_{10})	EN 12341
1.2	Particulate Matter ($PM_{2.5}$)	EN 14907
1.3	Particulate Matter ($PM_{10;2.5}$)	EN 16450
2.	Nitrogen dioxide	
3	nitrogen oxide	
4	sulphur dioxide	
5	carbon monoxide	
6	Hydrogen sulphide	
7	Carbon dioxide	
8	Volatile organic compounds	
	ii) Manual measurement systems	
1.	Carbon monoxide	KS ISO 4224- Non-dispersive infrared spectrometric method
2	Carbon monoxide	KS ISO 8186- Gas chromatographic method
3	Sulphur dioxide	KS ISO 6767- Tetrachloromercurate (TCM)/pararosaniline method
4	Sulphur dioxide	KS ISO 4221- Thorin spectrophotometric method
5	Gaseous sulphur compounds	KS ISO 4219
6	Nitrogen oxides	KS ISO 7996- Chemiluminescence method
7	Nitrogen oxides	KS ISO 6768 - modified Griess - Saltzman method
8	*Asbestos fibres*	KS ISO 10312- *Direct transfer transmission electron microscopy method*
9	*Asbestos fibres*	KS ISO 13794- *Indirect-transfer transmission electron microscopy*

		method
10	*Ozone*	KS ISO 10313- Chemiluminescence method
11	*Ozone*	KS ISO 13964- Ultraviolet photometric method.
12	Particulate matter (filter medium)	KS ISO 10473- Beta-ray absorption method
13	*(Gas and particle-phase) polycyclic aromatic hydrocarbons*	KS ISO 10498-GCMS method
14	Non-methane organic compounds	KS ISO 14965-DFID method
15	*Inorganic fibrous particles*	KS ISO 14966- *Scanning electron microscopy method*
16	Airborne inorganic fibres	KS ISO 8672- phase contrast optical microscopy - Membrane filter method
17	Lead(aerosols)	KS ISO 9855 – AAS method
18	*Particle-phase polycyclic aromatic hydrocarbons*	KS ISO 16362 – HPLC method
19	Volatile organic compounds	KS ISO 16017-1- sorbent tube/thermal desorption/capillary gas chromatography(Pumped sampling)
20	Volatile organic compounds	KS ISO 16017-2- sorbent tube/thermal desorption/capillary gas chromatography(Diffusive sampling)
21	Gaseous acid air pollution index	KS ISO 4220- Titrimetric method with or potentiometric end-point detection
22	Black smoke index	KS ISO 9835

Part IV: Meteorological Parameters

NO.	Parameter	Method of test
1.	Wind	KS ISO 16622
2	Temperature, Pressure and Humidity Data	KS ISO 8756- Handling

Part V: Modelling methods

NO.	Parameter	Method of Test

	Air dispersion modelling	CALPUFF Model AEROMOD Model

Part VI: Metrology of Measurements

NO.	Parameter	Method of test
1.	Wind measurements (anemometers/ thermometers)	KS ISO 16622
2	Wind measurements(rotating anemometer)	KS ISO 17713-1
3	Temperature(thermometer shields/screens)	KS ISO 17714
4		

Legend:

(2) ISO Standards

(a) ISO 7934:1989 Statlonary source emissions - Determination of the mass concentration of sulfur dioxide - Hydrogen peroxide/barium perchloratefThorin method.

(a) ISO 7934:1989/Amd 1:1998

(c) ISO 7935: Stationary source emissions - Determination of the mass concentration of sulfur dioxide - Performance characteristics of automated measuring method.

(d) ISO 9096: Stationary source emissions - Manual Determination of mass concentration of particulate matter.

(e) ISO 10155: Stationary source emissions - Automated monitoring of mass concentrations of particles - Performance characteristics, test methods and specifications

(f) ISO 10396: Stationary source emissions - Sampling for the automated determination of gas emissions concentrations for permanently-installed monitoring systems

(g) ISO 10397: Stationary source emissions - Determination of asbestos plant emissions method by fibre counting measurement

(h) ISO 10780: Stationary source emissions - Measurement of velocity volume flow rate of gas steams in ducts.

(i) ISO 10849: Stationary source emissions - Determination of the mass concentration of nitrogen oxides - Performance characteristics of automated measuring systems

(j) ISO 11338-1: Stationary source emissions - Determination of gas and particle-phase polycyclic aromatic hydrocarbons Part 1: Sampling.

(k) ISO 11338-2: Stationary source emissions - Determination of gas and particle-phase polycyclic aromatic hydrocarbons Part 2: Sample preparation, clean-up and determination.

(l) ISO 11564: Stationary source emissions - Determination of the mass concentration of nitrogen oxides -Naphthylethylenediamine photometric method.

(m) ISO 11632: Stationary source emissions - Determinatlon of mass concentration of sulphur dioxide - Iron chromatography method

(n) ISO 12039: Stationary source emissions - Determination of carbon monoxide, carbon dioxide and oxygen - Performance characteristics and calibration of automated measuring systems. ISO 12141: Stationary source emissions - Determination of mass concentration of particulate matter (dust) at low concentrations- Manual gravimetric method.

(o) ISO 14164: Stationary source emissions - Determination of the volume flow-rate of gas streams in ducts -Automated method,

(p) ISO 15713: Stationary source emissions - Sampling and determination of gaseous fluoride content.

(3) USEPA Methods

(a) Method 1 - Traverse Points

(b) Method 1A - Small Ducts

(c) Method 2 - Velocity - S-type Pilot

(d) Method 2A - Volume Meters

(e) Method 28- Exhaust Volume Flow Rate

(f) D Method 2C - Standard Pitot

(g) Method 20 - Rate Meters

(h) Method 2F - Flow Rate Measurement with 3-D Probe

(i) Method 2G - Flow Rate Measurement with 2-D Probe

(j) Method 2H - Flow Rate Measurement with Velocity Decay Near Stack Walls

k) Memo - New Test Procedures of Stack Gas Flow Rate in Place of Method 2

(I) Method 3 - Molecular Weight

(m) Method 3A - CO2, 02 by instrumental methods

(n) Method 38 - CO2, 02 by Orsat apparatus

(o) Method 3C - CO2, CH4, N2, 02 by determined by thermal conductivity

(p) Method 4 - Moisture Content

(q) Method 5- Particulate Matter (PM)

(r) Method 50 - PM Baghouses {Particulate Matter)

(s) Method 5E - PM Fiberglass Plants (Particulate Matter)

(t) Method 5F -PM Fluid Catalytic Cracking Unit

(u) Method 51- Determination of Low Level Particulate Matter Emissions

(v) Method 6- Sulphur Dioxide (S02)

(w) Method 6A - S02, CO2

(x) Method 68- S02, CO2 - Long Term Integrated

(y) Method 6C- S02 - Instrumental

(z) Method 6C - Figures S02

(aa) Method 7 - Nitrogen Oxide (NOx)

(aa) Method 7A- NOx - Ion Chromatographic Method

(bb) (cc) Method 78- NOx - Ultraviolet Spectrophotometry

(cc) (dd) Method 7C - NOx - Colorimetric Method

(ee) Method 7D - NOx - Ion Chromatographic

(ff) Method 7E - NOx - Instrumental

(gg) Method 8 -Sulfuric Acid Mist

(hh) Method 9 - Visual Opacity

(ii) Method 10 - Carbon Monoxide-NDIR

(jj) Method 1OA - CO for Certifying CEMS

(kk) Method 1OB -CO from Stationary Sources

(II) Method 11 - H2S Content of Fuel

(mm) Method 12 - Inorganic Lead

(nn) Method 13A- Total Fluoride (SPADNS Zirconium Lake)

(oo) Method 138 - Total Fluoride (Specific Ion Electrode)

(pp) Method 14- Fluoride for Primary Aluminium Plants

(qq) Method 14A- Total Fluoride Emissions from Selected Sources at Primary Aluminium Plants

(rr) Method 15- Hydrogen Sulfide, Carbonyl Sulfide, and Carbon Disulfide

(ss) Method 15A - Total Reduced Sulfur (TRS Alt.)

(tt) Method 16 - Sulfur (Semicontinuous Determination)

(uu) Method 16A- Total Reduced Sulfur (Impinger)

(vv) Method 168 - Total Reduced Sulfur (GC Analysis)

(ww) Method 17 - In-Stack Particulate (PM)

(xx) Method 18 - voe by GC

(yy) Method 19 - S02 Removal & PM, S02, NOx Rates from Electric Utility Steam Generators

{zz) Method 20 - NOx from Stationary Gas Turbines

(aaa) Method 21 - VOC Leaks

(bbb) Method 22 - Fugitive Opacity

(ccc) Method 23- Dioxin and Furan (02/91 FR Copy)

(ddd) Method 25-: Gaseous Nonmethane Organic Emissions

(eee) Method 25A - Gaseous Organic Concentration (Flame Ionization)

(fff) Method 25B - Gaseous Organic Concentration (Infrared Analyzer)

(ggg) Method 26- Hydrogen Chloride, Halides, Halogens

(hhh) Method 26A- Hydrogen Halide & Halogen-lsokinetic

(iii) Method 28A -Air to Fuel Ratio, Burn Rate - Wood-fired Appliances

(jjj) Method 29 - Metals Emissions from Stationary Sources

(kkk) Method 101 -Mercury from Chier-Alkali Plants {Air)

(Ill) Method 101A- Mercury from Sewage Sludge Incinerators

(mmm)Method 102 - Mercury from Chlor-Alkali Plants (Hydrogen Streams)

(nnn) Method 103- Beryllium Screening Method

(ooo) Method 104 - Beryllium Emissions Determination

(ppp) Method 106 - Determination of Vinyl Chloride

(qqq) Method 107A - *Vinyl* Chloride content of Solvents

(rrr) Method 108 - Particulate & Gaseous Arsenic emissions

(sss) Method 108B -Arsenic

(ttt) Method 108C -Arsenic

(uuu) Methods 203A, B, and C - Opacity Determination for Time-Averaged Regulations

(vvv) Method 303 - By-product Coke Oven Batteries

(4) British Standards

(a) BS 3405:1983 Method for measurement of particulate emission including grit and dust (simplified method).

(b) BS EN 14181:2004 Stationary source emissions. Quality assurance of automated measuring systems.

(c) BS EN 15259: Air quality. Measurement of stationary source emissions. Measurement strategy, measurement planning, reporting and design of measurement sites.

(d) BS EN 15267-1: Air quality. Certification of automated measuring systems. General principles.

(e) BS EN 15267-2: Air quality. Certification of automated measuring systems. Initial assessment of the AMS manufacturer's quality management system and post certification surveillance for the manufacturing process.

(fj BS EN 15267-3: Air quality. Certification of automated measuring systems. Performance criteria and test procedures for automated measuring systems for monitoring emissions from stationary sources.

~~**METHODS OF TEST AND MEASUREMENT OF AIR POLLUTANTS**~~

~~**List of methods of test and measurement of air pollutants**~~

	~~**Standard**~~
~~1~~	~~KS ISO 10155 Stationary source emissions -- Automated monitoring of mass concentrations of particles -- Performance characteristics, test methods and specifications~~
~~2~~	~~KS ISO 10397 Stationary source emissions -- Determination of asbestos plant emissions -- Method by fibre count measurement~~
~~3~~	~~KS ISO 10780: Stationary source emissions -- Measurement of velocity and volume flow rate of gas streams in ducts~~
~~4~~	~~KS ISO 10849: Stationary source emissions -- Determination of the mass concentration of nitrogen oxides -- Performance characteristics of automated measuring systems~~
~~5~~	~~KS ISO 11338-1: Stationary source emissions -- Determination of gas and particle-phase polycyclic aromatic hydrocarbons -- Part 1: Sampling~~
~~6~~	~~KS ISO 11338-2: Stationary source emissions -- Determination of gas and particle-phase polycyclic aromatic hydrocarbons -- Part 2: Sample preparation, clean-up and determination~~
~~7~~	~~KS ISO 11564: Stationary source emissions -- Determination of the mass concentration of nitrogen oxides -- Naphthylethylenediamine photometric method~~

	Standard
8	KS ISO 11632: Stationary source emissions -- Determination of mass concentration of sulfur dioxide -- Ion chromatography method
9	KS ISO 12039: Stationary source emissions -- Determination of carbon monoxide, carbon dioxide and oxygen -- Performance characteristics and calibration of automated measuring systems
10	KS ISO 12141: Stationary source emissions -- Determination of mass concentration of particulate matter (dust) at low concentrations -- Manual gravimetric method
11	KS ISO 14164: Stationary source emissions -- Determination of the volume flow rate of gas streams in ducts -- Automated method
12	KS ISO 15713: Stationary source emissions -- Sampling and determination of gaseous fluoride content
13	KS ISO 7708: Air quality -- Particle size fraction definitions for health-related sampling
14	KS ISO 11041: Workplace air -- Determination of particulate arsenic and arsenic compounds and arsenic trioxide vapour -- Method by hydride generation and atomic absorption spectrometry
15	KS ISO 11174: Workplace air -- Determination of particulate cadmium and cadmium compounds -- Flame and electrothermal atomic absorption spectrometric method
16	KS ISO 15202-1: Workplace air -- Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry -- Part 1: Sampling
17	KS ISO 15202-2: Workplace air -- Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry -- Part 2: Sample preparation
18	KS ISO 15202-3: Workplace air -- Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry -- Part 3: Analysis
19	KS ISO 15767: Workplace atmospheres -- Controlling and characterizing errors in weighing collected aerosols
20	KS ISO 16107: Workplace atmospheres -- Protocol for evaluating the performance of diffusive samplers
21	KS ISO 16200-1: Workplace air quality -- Sampling and analysis of volatile organic compounds by solvent desorption/gas chromatography -- Part 1: Pumped sampling method
22	KS ISO 16200-2: Workplace air quality -- Sampling and analysis of volatile organic compounds by solvent desorption/gas chromatography -- Part 2: Diffusive sampling method
23	KS ISO 16702: Workplace air quality -- Determination of total isocyanate groups in air using 2-(1-methoxyphenyl) piperazine and liquid chromatography
24	KS ISO 16740: Workplace air -- Determination of hexavalent chromium in airborne particulate matter -- Method by ion chromatography and spectrophotometric measurement using diphenyl carbazide
25	KS ISO 17733: Workplace air -- Determination of mercury and inorganic mercury

	Standard
	compounds -- Method by cold-vapour atomic absorption spectrometry or atomic fluorescence spectrometry
26	KS ISO 17734-1: Determination of organonitrogen compounds in air using liquid chromatography and mass spectrometry -- Part 1: Isocyanates using dibutylamine derivatives
27	KS ISO 17734-2: Determination of organonitrogen compounds in air using liquid chromatography and mass spectrometry -- Part 2: Amines and aminoisocyanates using dibutylamine and ethyl chloroformate derivatives
28	KS ISO 20552: Workplace air -- Determination of mercury vapour -- Method using gold-amalgam collection and analysis by atomic absorption spectrometry or atomic fluorescence spectrometry
29	KS ISO 4224: Ambient air -- Determination of carbon monoxide -- Non-dispersive infrared spectrometric method
30	KS ISO 6767: Ambient air -- Determination of the mass concentration of sulfur dioxide -- Tetrachloromercurate (TCM)/pararosaniline method
31	KS ISO 7996: Ambient air -- Determination of the mass concentration of nitrogen oxides -- Chemiluminescence method
32	KS ISO 8186: Ambient air -- Determination of the mass concentration of carbon monoxide -- Gas chromatographic method
33	KS ISO 10312: Ambient air -- Determination of asbestos fibres -- Direct transfer transmission electron microscopy method
34	KS ISO 10313: Ambient air -- Determination of the mass concentration of ozone -- Chemiluminescence method
35	KS ISO 10473: Ambient air -- Measurement of the mass of particulate matter on a filter medium -- Beta-ray absorption method
36	KS ISO 10498: Ambient air -- Determination of sulfur dioxide -- Ultraviolet fluorescence method
37	KS ISO 12884: Ambient air -- Determination of total (gas and particle-phase) polycyclic aromatic hydrocarbons -- Collection on sorbent-backed filters with gas chromatographic/mass spectrometric analyses
38	KS ISO 13794: Ambient air -- Determination of asbestos fibres -- Indirect transfer transmission electron microscopy method
39	KS ISO 13964: Air quality -- Determination of ozone in ambient air -- Ultraviolet photometric method.
40	KS ISO 14965: Air quality -- Determination of total non-methane organic compounds -- Cryogenic pre-concentration and direct flame ionization detection method
41	KS ISO 14966: Ambient air -- Determination of numerical concentration of inorganic fibrous particles -- Scanning electron microscopy method
42	KS ISO 16362: Ambient air -- Determination of particle-phase polycyclic aromatic hydrocarbons by high performance liquid chromatography
43	KS ISO 7168-1: Air quality -- Exchange of data -- Part 1: General data format
44	KS ISO 7168-2: Air quality -- Exchange of data -- Part 2: Condensed data format

	Standard
45	KS ISO 9169: Air quality -- Definition and determination of performance characteristics of an automatic measuring system
46	KS ISO 11222: Air quality -- Determination of the uncertainty of the time average of air quality measurements
47	KS ISO 13752: Air quality -- Assessment of uncertainty of a measurement method under field conditions using a second method as reference
48	KS ISO 14956: Air quality -- Evaluation of the suitability of a measurement procedure by comparison with a required measurement uncertainty
49	KS ISO 20988: Air quality -- Guidelines for estimating measurement uncertainty
50	KS ISO 16622: Meteorology -- Sonic anemometers/thermometers -- Acceptance test methods for mean wind measurements
51	KS ISO 17713-1: Meteorology -- Wind measurements -- Part 1: Wind tunnel test methods for rotating anemometer performance
52	KS ISO 17714: Meteorology -- Air temperature measurements -- Test methods for comparing the performance of thermometer shields/screens and defining important characteristics
53	KS ISO 16000-1: Indoor air -- Part 1: General aspects of sampling strategy
54	KS ISO 16000-2:Indoor air -- Part 2: Sampling strategy for formaldehyde
55	KS ISO 16000-3: Indoor air -- Part 3: Determination of formaldehyde and other carbonyl compounds -- Active sampling method
56	KS ISO 16000-4: Indoor air -- Part 4: Determination of formaldehyde -- Diffusive sampling method
57	KS ISO 16000-5: Indoor air -- Part 5: Sampling strategy for volatile organic compounds (VOCs)
58	KS ISO 16000-6: 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	KS ISO 16000-8: Indoor air -- Part 8: Determination of local mean ages of air in buildings for characterizing ventilation conditions
60	KS ISO 16000-9: Indoor air -- Part 9: Determination of the emission of volatile organic compounds from building products and furnishing -- Emission test chamber method
61	KS ISO 16000-10: Indoor air -- Part 10: Determination of the emission of volatile organic compounds from building products and furnishing -- Emission test cell method
62	KS ISO 16000-11: 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	KS ISO 16017-1: Indoor, ambient and workplace air -- Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography -- Part 1: Pumped sampling
64	KS ISO 16017-2: Indoor, ambient and workplace air -- Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography --

	Standard
	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 m ass 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).

	~~Standard~~
~~90~~	~~KS 03-1310: Specification for fuel oils~~
~~91~~	~~KS 03-91: Specification for liquefied petroleum gases (LPG).~~

R27

TWELFTH SCHEDULE

ACCEPTALBLE MOBILE EMMISION 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.

	Pollutant	**Control measures**
	NO_X Exhaust	Exhaust Gas Recirculation (EGR) Valves
	HC, CO Exhaust	Three Way Catalyst (TWC), 2nd 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

	Cause	**Measure**
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

r85

THIRTEENTH SCHEDULE

FEES

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 14th schedule under category I :- *KShs.50,000/=*
(ii) Facility listed in 14th schedule under category II :- *KShs.30,000/=*
(iii) Polluting facility not in Fourteenth Schedule other than (i) and (ii) above :- *KShs.20,000/=*

(c) Variation of emission Licence is 10% of the Annual Licence fee

i. (d) Mobile Source Testing Centre an application fees for mobile source testing centres; - 50,000/-
ii. Annual operational license for mobile source testing centres – 100,000/-

f. Mobile Source Operator or owner

i. Emission testing levy at…… to be charged by the testing centres for each mobile source in each of the categories below;

Mobile Source	price	
Motorcycles and tricycles		
Motor vehicles less than 3.5 tn		
Motor vehicles Exceeding 3.5		
Locomotives		
Vessels		
Aircrafts		

j. Emission testing and monitoring fees at 10% of the testing levy charged per mobile source by the designated testing Centre to a minimum of Kshs. 500/-; -

r14.

FOURTEENTH SCHEDULE

LIST OF CONTROLLED FACILITIES

a. Stationary sources

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 and production 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
Pyrolysis
Hydrocarbon recycling plant
Copper smelting (primary and secondary)
Gold mine ores processing plant
Upstream and midstream petroleum facilities
Edible oil processing plants
Tanneries
Sugar processing plants
Nuclear plants
Coal plants

Part

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

Textile industries
Tea processing plants
Part III

Any other facility that the Authority may identify
Quarry operations
Major construction sites s
Crematoriums
Outdoor spraying/painting

b. Mobile Sources

PART I - Vehicles
Cars,
Trucks, Motorcycles
Tricycles
PART II - marine vessels

PART III – locomotives
PART IV - Aircrafts
,
,

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

Code of Conduct for Designated and Licensed air quality measurement Laboratories

NOVEMBER, 2022

No.	Item	Subject Matter
1	Citation	This may be cited as the code of conduct for air quality measurement laboratories
2	Application	This code of conduct shall apply to all designated and licensed air quality measurement laboratories
3	Fundamental Principles	Designated and licensed air quality measurement Laboratories shall; a) Uphold and advance integrity in the conduct of their work b) Be professional and honest in their service to clients c) Shall avoid conflicts of interest. d) Subject their emission measurement staff to at least two refresher courses annually within their scope of designation
4	**Obligations to Clients**	Designated and licensed Laboratories shall; a. Act in professional manner to client b. Not solicit or accept financial or other valuable consideration, directly or indirectly, from clients or other parties in connection with work for employers or clients for which they are responsible. c. Not disclose facts, data or information obtained in a professional capacity without the prior consent of the client. d. Not falsify or misrepresent data e. Interpret issues to the client and offer advice in an objective and truthful manner
5	**Obligations to the Authority**	The designated and licensed Laboratory shall ensure that ; i. Only competent personnel identified in the designation process are involved in the testing and approval of the analysis report ii. Any change in the competent personnel is duly approved by the Authority iii. Only equipment evaluated for the laboratory is used for the relevant measurements iv. Where subcontracting is undertaken of the equipment the

		analysis results will be countersigned by the subcontracted laboratory v. Emissions measurements are conducted for only parameters relevant for the sector vi. All equipment used in testing for the particular parameters are validly calibrated vii. Emissions tests are done in line with methods set in this Regulations viii. Emission measurement results are not falsified
6	**Consequences of non-compliance**	Any designated laboratory which contravenes this code of conduct risks having its designation withdrawn